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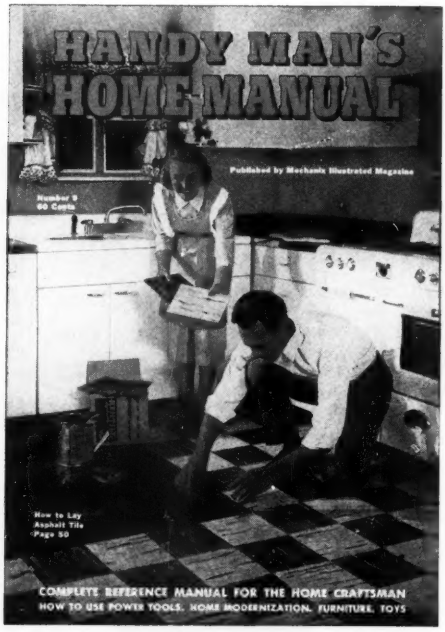

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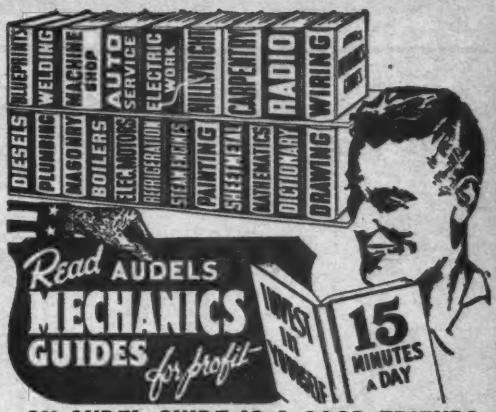

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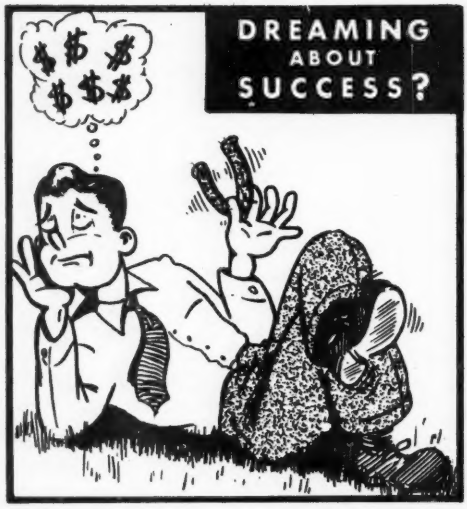

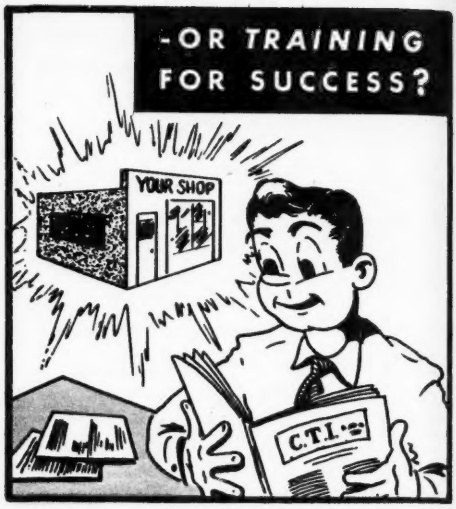

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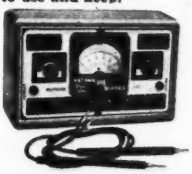

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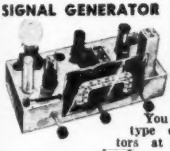
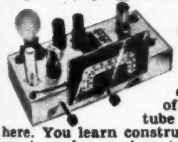


You construct the Transitron Signal Generator shown here, demonstrating Transitron principles in both R.F. and A.F. stages. You study negative type oscillators at first-hand.

AUDIO OSCILLATOR:

An electronic device, which produces audio-frequency signals for modulating R.F. (radio frequency) carrier waves, testing A.F. (audio frequency) amplifiers, speakers, etc.

T.R.F. RECEIVER



You build several T.R.F. Receivers, one of which, a 4-tube set, is shown here. You learn construction, alignment, make receiver tests, and do trouble shooting.

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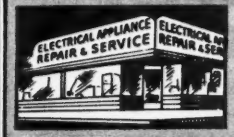

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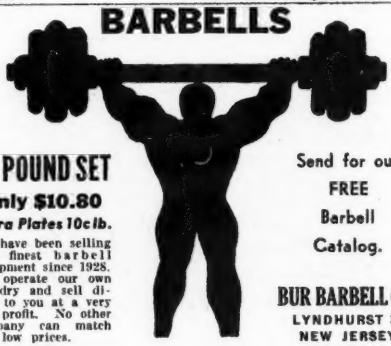

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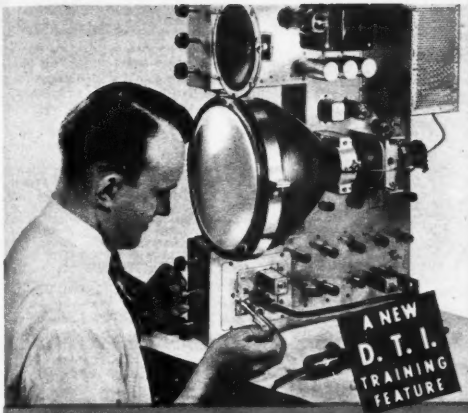

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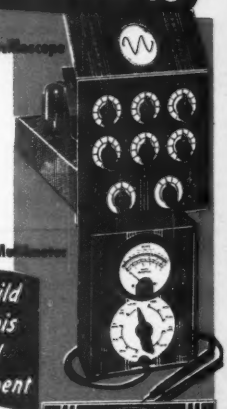

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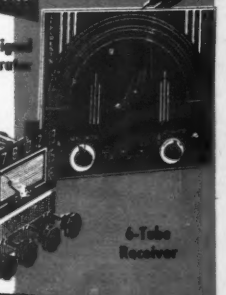

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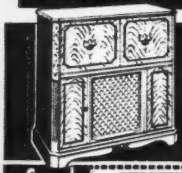

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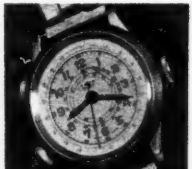

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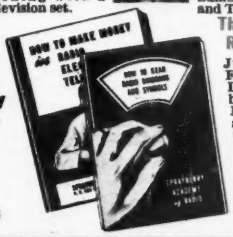

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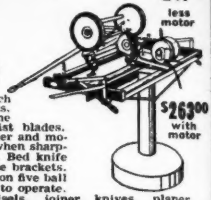

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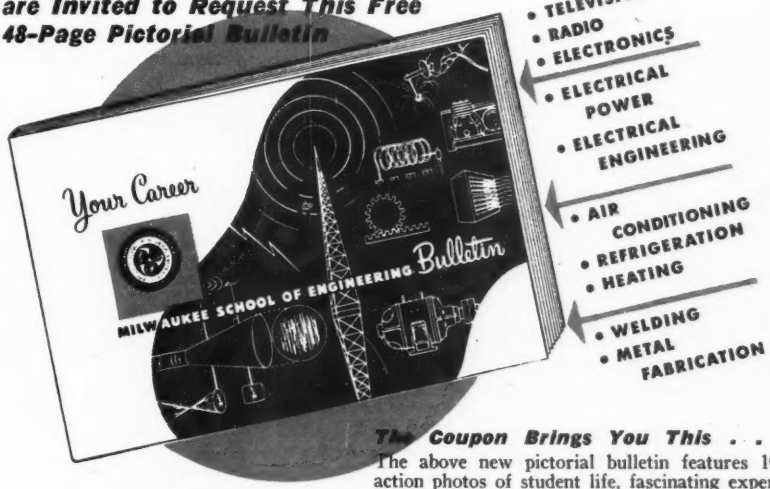

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The Editor's Workbench

MI Photography Editor Bob Brightman doesn't confine his talents to making fine photos or building 6-inch telescopes. Here he uses bandsaw in his home shop.

Strawberry Automobiles

Remember the story about the Communist who was telling his soap-box audience what sheer delight their lives would be when the Reds got in the driver's seat?

"Comes the Ravolution," he screams, "and averybody'll have stromberries and cream for breakfast!"

One little guy down in the front row pipes up, "But I don't want strawberries and cream for breakfast."

"Yah!" retorts the Commie, "comes the Ravolution, you'll eat stromberries and cream for breakfast—and like it, too!"

Any resemblance between a Moscovian bowl of strawberries and cream, and a Michigan-made automatic transmission, with or without sugar, is undoubtedly pure coincidence. But the way the situation shapes up today, it would seem that within five years, and maybe a whole lot sooner, shiftless shifting will be one of those "you're gonna get it —and you're gonna like it" gadgets of our brave new postwar world.

Now I have nothing against any of the various species of automatic transmission. I am even willing to concede, along with the boys who designed them, that they represent triumphs of engineering genius unsurpassed since the invention of the wheel. But I am not willing to go along with the Detroit version which claims that automatic transmission will be a must on every car "because the public demands it."

"Public demand" my eye. How about it, pal —you been sitting up late nights, composing redhot letters and telegrams to your favorite automobile manufacturer, *demanding* automatic transmission on your next Squirrelbait Eight and threatening to buy some other brand of car if you don't get it? How's that? You mean you *haven't* been sending any threatening letters to the auto moguls, demanding your rights?

Well, I didn't think so. Because I have just been going over a reasonably impressive pile of letters and postcards from MI readers all over the world, and here's how they feel about automatic transmission:

Want it: 8% Don't want it: 92%

Wrote one slightly indignant Pennsylvania gentleman: "I don't recall the slightest attempt by anyone ever to find out if the public wants invisible wheels, enough chrome to pave a tennis court, hummingbird-skin upholstery trim, deep-well engines, bodies that look like a Rose Bowl float, electric window twiddlers, radar-controlled tops, and bumpers that will crumple seven acres of tin the first time a good-sized sparrow hits them."

As for automatic transmission, nobody from Detroit ever asked him about that, either, but if they ever do he'll tell 'em NO.

All through these hundreds of communiques (not thousands, just hundreds) ran the feeling, "Why don't they ask us—the people who buy automobiles—what we want in the new cars, instead of telling us what we're going to get and then making believe we were the ones who asked for it in the first place?"

Most of those who don't want automatic transmission forced on them à la strawberries and cream object to it on grounds of expense. Or performance. Or safety. Well, probably time and experience will eliminate most of the engineering bugs and bring the cost down within reason. Nevertheless, the buyers are now showing signs of rebellion against the old take-it-and-like-it tactics and that, to me, is important. Comes the Ravolution?

—*Bill Parker*

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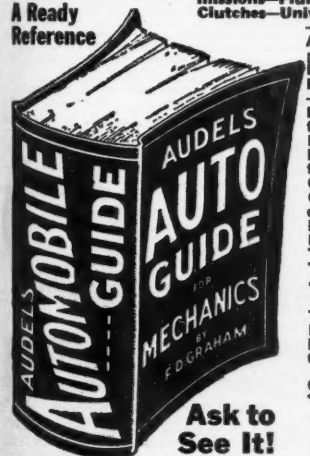

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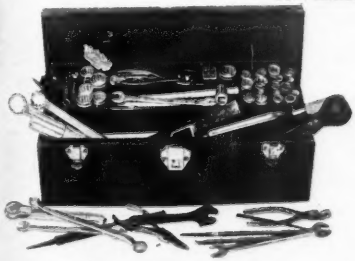

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Invention Clinic

BY JOSEPH H. KRAUS

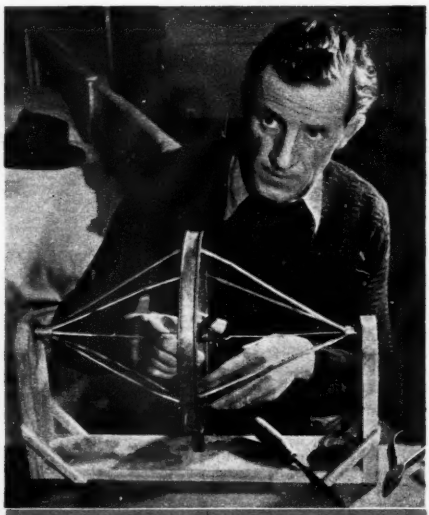
Perpetual Motion—3

A perpetual-motion dream pops up in scientific publications now and then in the guise of a novel compressed-air machine. Key to one design of this sort is a bicycle seat built on the piston of a pump. Every time the driver of this vehicle bounces up and down he pumps more air into a reservoir. A tube from this tank feeds the compressed air into a motor that turns the rear wheel and thus rolls the bounce-buggy down the road.

So far, it seems like a good stunt—provided the rider jogs himself up and down enough to build up sufficient pressure to get going. But the inventor decided to embellish his creation by mounting cleats across the rear tire—to increase the number of bounces and so give more strokes to the pump.

The more bumps—he apparently figured—the more air he could pump into the tank and the more speed he could make. The faster he went, the more bumps he "developed"—till maybe at last he simply bounced off into space.

Oddly, neither the inventors nor the publishers seem to realize that such a Bouncing Betty is just another impractical perpetual-motion affair.



MOTORLESS MOTOR is Kurt Schaetzle's entry in the perpetual-motion derby. A 38-year-old German mechanic, he's already spent 12 years working on his idea. He claims the weighted spring in his flywheel will keep flipping and spin the machine forever.

Stored Power

Only a few months ago a compressed-air automobile got a lot of attention for its inventor. Two storage batteries ran a motor for the compressor that powered the air engines. It was claimed that the auto could travel many miles a day without recharging the batteries. The idea was that enough air could be pumped up on a downhill run to carry the car over the next hill. Of course, if the compressed air could run the car, it would do better with a direct-motor drive. Loss of energy during compression is very great and makes the compressed-air setup a poor substitute for a direct electrical drive.

Among other troubles, nothing has been done here to work out a good mechanical system for handling the change of pace. Some years ago an inventor patented a power glider in which a tiny gasoline engine used gears to wind up a big rubber-band motor connected to the propeller. After running for a number of minutes, all the stored power was expended in one quick burst that spun the propeller fast enough to launch the glider. Meanwhile, the engine continued to wind the motor for the next burst, to help the glider gain altitude for free soaring. This looks like a good system. We wonder what happened to the idea.

Pile drivers, pounding mills, air rifles, impulse starters, clocks, watches and other spring mechanisms do apply the principle of storing power. But such devices are all too few.

If you can work up a power-storage system that would be inexpensive, light and more efficient than a storage battery, you'll soon have the world at your feet. You don't have to invent any perpetual-motion gadget.

Water Machines

Many an alert student in high-school physics has watched water rise in a thin-walled tube or soak into a wick and wondered if he could convert this [*Continued on page* 28]

Electrical Equipment Technicians..
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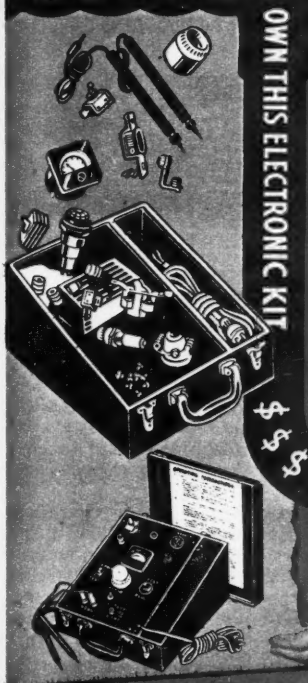

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Invention Clinic

[*Continued from page* 26]

capillary movement into perpetual motion. He could do the trick, he might figure, by cutting off the tube just below the point reached by the water and letting it bubble off the top—or by getting the wick to furnish a constant stream of liquid to a point higher than the original level of the water.

The first scheme won't work because the very forces which bring about the capillarity also prevent the water from spilling out of the open end of the tube. It's simple to prove this. You don't have to cut off the tube. Just push it lower into the liquid. The effect is the same as with a shorter tube. What happens? Nothing—the water level won't rise.

The wick stunt can furnish motion and power. Just place a couple of sheets of blotting paper on both pans of a beam balance. Make the left side slightly heavier. Set the wick in the water and bend it so that it touches the blotting paper on the right pan. Now the wick absorbs water, which spreads to the blotting paper. This, in turn, grows heavier. The blotter's pan then drops away from the bent wick. When the water on the blotting paper evaporates, the right-hand pan rises and touches the wick again. *But the motion is not perpetual.*

Evaporation is essential to the operation. To bring the water back to its reservoir, the mechanisms must be contained in an enclosure. This means that the air will become so saturated that the device will stop working, since the evaporation can no longer take place. Of course, the device will not function during freezing temperatures.

Magnetic Devices

Modern powerful magnetic alloys have renewed interest in attempts to gain power from the strong magnetic forces so readily demonstrated. Doesn't one magnet keep another similar bar suspended in the air? Just suppose that you could continuously push another magnet into the position occupied by the floating piece. Couldn't you then produce a continuous motion from a continuous succession of lifts?

Yes, one magnet *will* keep another afloat in the air. But, no, you can't get continuous motion. The same force that tends to produce the motion also will prevent it. These magnetic forces act in all directions, not merely the way you hope they will act.

One design for a perpetual-motion mechanism, first published 120 years ago, consisted of a permanent bar magnet suspended like a

[*Continued on page* 32]

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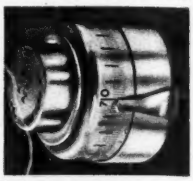

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Swapping Corner

I have a proposition to offer. If *you'll* publish the make of the two cars which beat Tom McCahill's Ford in the Indianapolis half-mile sprint (Auto Road Racing Comes Back, September MI), *I'll* promise to forget that yarn he told about the Mercedes driver and the eggs.

James J. Lyons
San Francisco, Cal.

It's a deal. The winner was an Oldsmobile 88 which made it in 31.5 seconds. Runner up was a '49 Cadillac which did it in 32.2. Tom's time was 32.3. And, by the way, he still swears by that egg story.

[*Continued on page* 35]

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Invention Clinic

[*Continued from page* 28]

pendulum from a bearing. On either side near the bottom of the bar were two other actuating bar magnets. Their poles were so disposed that one pushed, and the other pulled, the hanging bar. When the pendulum came close to the end of its swing, both of the actuating magnets were supposed to execute a half turn so that they presented opposite faces and reversed the action. They didn't—and, of course, the "perpetual" motion ended in a matter of seconds.

The reason is apparent to any who cares to look a bit beyond the details of the assumed operation. It takes as much energy—usually more—to pull magnets apart or rotate them in a field, as those same magnets produce when they approach one another. In a unilateral reaction, where a north pole always is to attract a south pole, the pole supposedly moving away is being held back with the same attractive force as the one which should be approaching. So, no motion is possible.

Why designers of perpetual-motion devices suddenly stop reasoning is a problem for a psychologist to fathom. As soon as they get to the point where action is meant to take place, they immediately abandon any attempt to follow out the problem to the logical end. Then they make a search for friction, wear and minor hinderances, instead of carrying the assumed actions beyond a purely theoretical stage.

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Changing the belt ratio, using gears to increase the speed of one or the other units or introducing a transformer merely increases the loss. Whenever there is any transfer of energy from one form to another, you can bet all your good American dollars that you'll get

[*Continued on page* 34]

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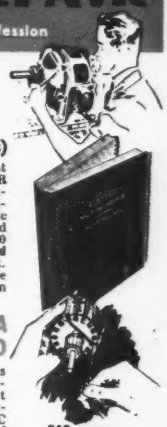

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Invention Clinic

[*Continued from page* 32]

a considerable loss during the conversion.

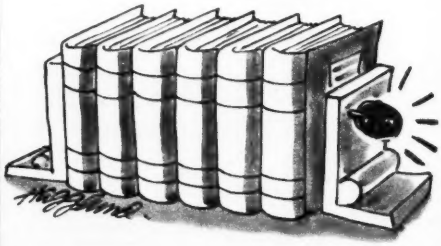
Power From the Sun

Solar energy could provide practically unlimited power if a good way to convert sunshine into electricity were devised. Theoretically, photoelectric cells might supply current directly from the sun. So far, though, no satisfactory cell has been developed yet—and prospects for such a device in the near future seem poor. Trouble is, a current-to-light-to-current combination is impractical because of the terrific loss of energy at each stage of the conversion.

We have covered only the major methods for attempting to achieve perpetual motion. The variations on these principal ones and on lesser known schemes of a similar sort are almost endless. If you want to toy with devices for producing energy continuously, spend a few hours studying up on past failures. Then be sure to give some real thought to applied physics and mechanics in following through on your project.

So, let's wind up our discussion of perpetual motion now and settle down to more practical matters.

Next month we shall discuss small inventions that may mean big money for you. •



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Dear Editor

[*Continued from page* 31]

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J. Thayssen
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[*Continued on page* 146]

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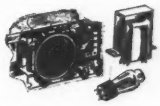

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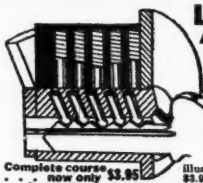

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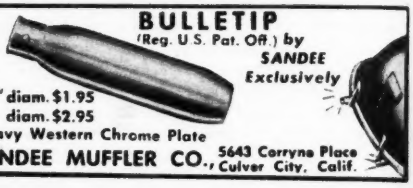

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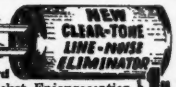

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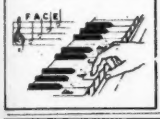

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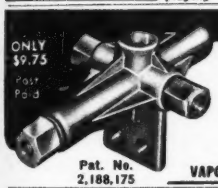

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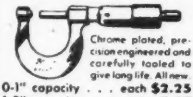

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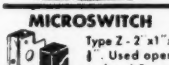

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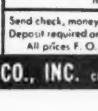

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It's a non-magnetic compass because magnetic compasses are of no help in the areas above Hudson Bay and below the Straits of Magellan, close to the magnetic poles. Nor can a sun compass, which indicates the direction of flight by direct sighting on the sun, be depended upon because of the many hours of twilight in these regions. The same is true of the astro compass, which measures direction by the stars or other heavenly bodies.

The principle upon which the new sky compass is based is analogous to that utilized in Polaroid sun glasses. It has long been known by physicists that light, ordinarily consisting of vibrations in all directions at right angles to the ray, can be obtained in the laboratory and exists in nature with its variations restricted to one direction or plane.

Such light is said to be polarized. An example is sunlight from the unclouded sky, scattered by the minute particles of the atmosphere. A sky compass, using this principle alone, might have an accuracy of ten degrees. The new Bureau compass makes use of a much more sensitive device.

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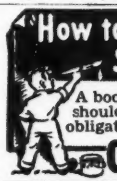

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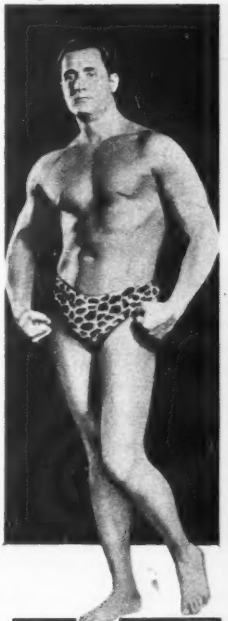

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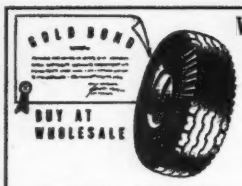

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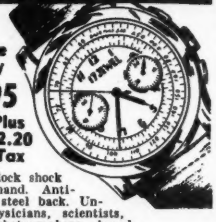

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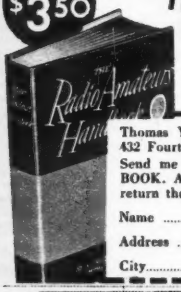

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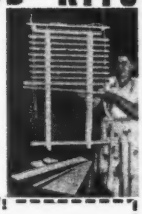

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LOOK! MAKE Money all year round selling personal initialed individualized belts, buckles, cap badges, tie holders, complete line Police and Firemen's Badges, 2000 emblems to choose. Big profits, whole or part time. Please write today special outfit offer. Hook-Fast Specialties, Box 1425, Dept. 4, Providence, R. I. Established 1926.

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FREE TEST Sample! Big Profits Selling new water repellent. Makes clothes, hats, shoes, sportwear, etc., shed water like duck's back. Convince Yourself! Send $1 for sprayer top bottle and details. Returnable for refund or credit. United Technical Laboratories, Box 425 K, Morristown, N. J.

SCHOOL SENIORS! A postal will bring you our wonder, Kwick-Sell Cardalog of popular Graduation Name Cards. Biggest profits! Only firm giving free Souvenir Chest and card case. Don't miss out. Hurry that postal! Craftcards, Box 235 (AF), Pittsburgh 30, Penna.

EXCELLENT SIDELINE for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also, make money with our line of Automobile Initials and Sign Letters. Free Samples. "Ralco." XL-Roxbury, Boston 19, Mass.

FREE SAMPLES. Big profits showing amazing Glow-In-The-Dark specialties. House numbers, pictures, plastic novelties, religious and nursery objects, etc. Large manufacturer. Madison Plastics, 303 Fourth Ave., New York 10, N. Y.

BIG MONEY Taking Orders: Shirts, Ties, Sox, Pants, Jackets, sweaters, shoes, uniforms, etc. Sales equipment free. Experience unnecessary. Nimrod, 4922-DO Lincoln, Chicago.

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"FORTIFY THE FUTURE." Start own business; home, office. Booklet describing "Collection of 137 Tested Plans" free. Elite Co., 220-G Grand St., New York 13, N. Y.

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SELL NEW—Used clothing from home, auto, store. Men's suits $1.25; Leather Jackets 85c; Overcoats 56c; Dresses 18c; Ladies' coats 38c. Other bargains. Catalog free. National Mail Order, 1219-U So. Jefferson, Chicago 7.

SCHOOL SENIORS—Earn 40% commission selling classmates America's most beautiful Graduation Name Cards. Largest Selection. Outsells all others. Free Sample Kit. Printcraft, Dept. I, 1425 E. Elm St., Scranton 5, Pa.

NEWEST MONEY-MAKING sensation, miniature authentic replicas, police and firemen's badges also pocket pieces, key chains. Write for descriptive folder. Hook-Fast Specialties, Dept. 24, Box 1425, Providence, R. I.

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STRANGE "DRY" Window Cleaner. Sells like wild. Replaces messy rags, liquids. Simply glide over glass. Samples sent on trial. Kristee 139, Akron, Ohio.

BOYS WANTED. Over $2.00 hour. Sell name plates for front doors. Free Sample. Write Dept. 85, National Engravers, 214 Summer, Boston, Mass.

HEY, SCHOOL Seniors! Want spending money? Then rush postal for simple instructions! Craftcards, Box 235 (FA), Pittsburgh 30, Penna.

WOULD YOU pay 3%—first $350 made? Book "505 Odd Successful Enterprises" free! Expect something odd! Pacific, Oceanside, Calif.

SELL DRUG Sundries!!! Balloons, Combs, Novelties. Razor Blades, Specialties, Carleton House Distributors, Texas City, Texas.

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SEE OUR ad under motorscooters for Midget Car Bargains. Midget Motors Directory, Athens, Ohio.

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mechanix illustrated
December 1949

How To Invent a Million-Dollar Toy

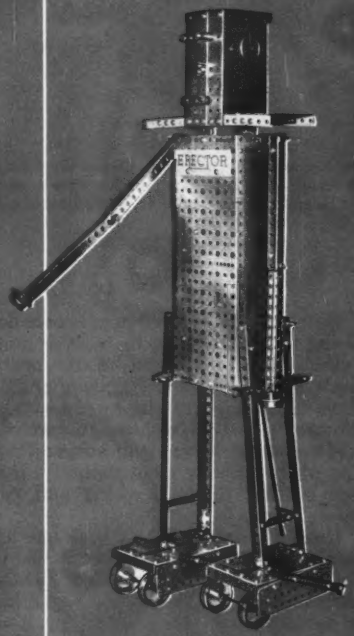
With 43 million customers yammering for new playthings, you can really haul in cash if you get to work and use your ingenuity.

By W. A. Swanberg

BABY was cutting a tooth and kicking up quite a fuss. Harvey Rath, the baby's father, was laid up at home with a game leg.

Rath felt sorry for the tyke, and besides, the noise made it hard for him to concentrate on his reading. How could he placate the child and restore peace and quiet to his home?

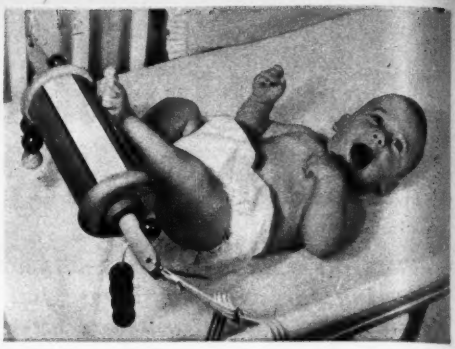
He took a careful look at his son and saw that, as the baby cried, he kicked his feet ceilingward in an upside-down pedaling motion. Maybe if the child had something to kick at—something that would jiggle and amuse him—he would develop a new interest in his young life and stop yowling.



The Big Three

Here they are, the three toys sometimes considered the top moneymakers of all time—Dy-Dee Doll, Monopoly and Erector Set. More than $25 million worth of Dy-Dees, the dolls that wet, have been sold and the inventor has probably made close to a million in royalties alone. Charles Darrow, originator of Monopoly, has retired on the royalties from the eight million games sold. A. C. Gilbert, inventor of Erector Sets, owns his own factory which has turned out 20 million sets with a retail value of $100 million.

When Vernon Eisel made this Cradle Gym for his injured daughter he never thought that over three million would be sold and he'd collect $10,000 annual royalties.



This is the Cradle Spin which Harvey Rath invented mainly to keep his son quiet while teething. It brought silence—and, incidentally, royalties galore.

Rath sawed off a section of broom handle. Using this as an axle, he built around it a cylinder of wood and stout cardboard, prettying it up with bright paper and Scotch tape. Inside the cylinder he put a couple of dime-store bells. He placed this weird contraption in the baby's crib, suspending each end of the axle by stout twine from a side rail so that it could swing and revolve freely.

Howling lustily, Junior took one look at this alien presence and kicked it. The cylinder swung, rolled and tinkled. Fascinated, the baby stopped crying and began kicking in earnest. Rath was pleased, but it wasn't until later that a friend saw the gadget and suggested that the idea ought to be good enough to market.

So, Rath demonstrated his invention to Childhood Interests, Inc., one of the top toy makers. They liked the idea, refined it a bit, put it into production as the Cradle Spin and Rath has been collecting juicy royalties ever since. Thus, by sheer chance, his eyes were opened to the millions the toy industry can dish out to someone with a solid idea.

Yes, there's gold in toys. The toy industry is a $300,000,000 annual business which caters to 43,000,000 American children—all potential customers. It's a field in which the home craftsman with some knowledge of what makes kids tick has a decided advantage. Present a toy maker with an idea that will appeal to two or three per cent of those customers and, brother, you can burn up the mortgage on the old homestead and really start worrying about income taxes.

But let's be honest and admit that this is a very difficult thing to do. You're competing with geniuses hired by toy companies to hatch just such creations. For every good idea a manufacturer gets from outsiders, there are hundreds which he must reject. Most toy executives will echo the sentiments of William A. Finerty of Childhood Interests:

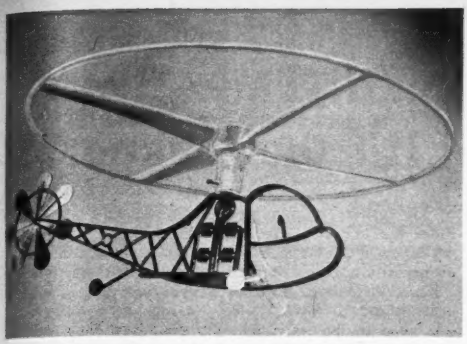
"Yes, we welcome new ideas—they're our meat and drink—but please don't get the impression that its easy. We *don't* want half-baked modifications of ideas that were old years ago. We *don't* want somebody else's idea with a new paint job. We *don't* want ideas that are beautiful in theory but develop into toys that nobody can afford to buy. We *do* want really fresh new ideas for toys that will have mass appeal and can be inexpensively manufactured."

There you have it. The idea has to be new. It has to be easily made. It has to attract buyers.

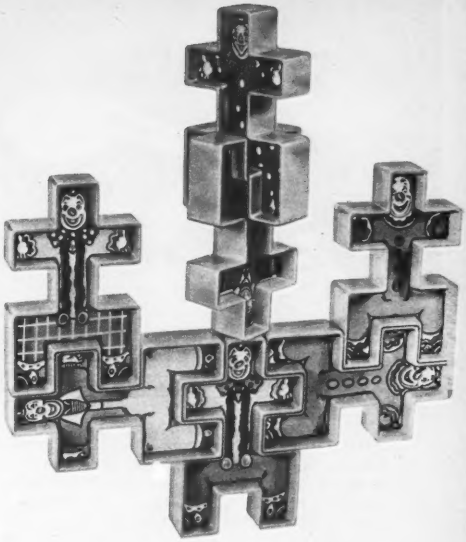
These conditions are hard to meet but amateur hobbyists have done it time and time again. A couple of years ago Elmer Peterson had a low opinion of his little daughter's toys. "I can dope out better toys than those myself," he thought.

Peterson noticed that Carol, then aged three, liked to put little things together. Working from this, he fashioned a group of little wooden men whose arms, heads and legs project in such a way that they can be fitted together in numerous amusing designs. He painted clowns' faces on the pieces and Noma Toys was interested the moment they saw his model. They produced it under the name of Tumble Clowns and it has sold by the thousands.

Simple? Yes—some of the best toy ideas are simple. Well, this simple Tumble Clowns toy helped Peterson buy a handsome home out in New Jersey and he's still collecting fancy royalties which he hopes will continue indefinitely.



Ken's Flying Hel'copter is a Tenite dollar toy which Ken Crowder originally invented as a means of earning capital for further experiments on real flying machines.



When Elmer Peterson noticed his daughter liked to put things together he went to work on Tumble Clowns—figures with arms, heads and legs that fit together. He's still collecting royalties.

"But it's a tricky business," Peterson says. "I sold another idea to a different company a little later. They were enthusiastic about it, but for some reason the toy didn't become popular. I made only a few hundred dollars on that one."

Makers generally pay royalties of from two to five per cent to the inventors. Someone in the back row can be heard saying, "Why deal a manufacturer into the profits at all? Why not mass produce your own idea and collect all the cash yourself?"

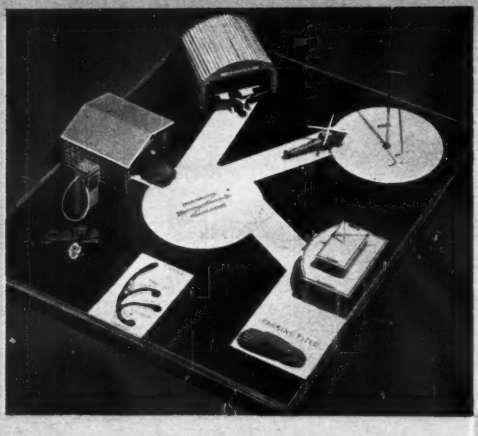
That's a risky procedure, even if you have money to gamble. You're wiser to let the maker do the gambling and collect your royalties if the idea clicks. Toy makers are specialists with production and merchandising know-how no amateur can hope to match. A well-known firm like Holgate or Playskool can land a toy in department stores in Paducah and Tuscaloosa while an outsider wouldn't have a prayer. And how can the public buy your toys if the store buyers won't buy them first?

It's well to remember that a toy that will enjoy a steady year-round sale is better than one that appeals only at Christmas. Bear in mind, too, that in this atomic age the toy business has formed a partnership with science.

If you've bought any toys lately, you've noticed that the salesperson doesn't merely say "Your child will have fun with this toy." Today toy salesmen point out that the toy will exercise the child's arms or develop his coordination. It'll stimulate his imagination or give him a harmless outlet for destructive urges. The Toy Guidance Council, Inc., an independent organization, has been doing an effective job of furnishing information concerning the functional play advantages [*Continued on page* 63]

Snippie is a variation of an old idea. It's an electric vibration toy bird whose bill moves smoothly through paper whenever the release button is pressed. Most important, it cuts through nothing else so it's safe for the youngsters.

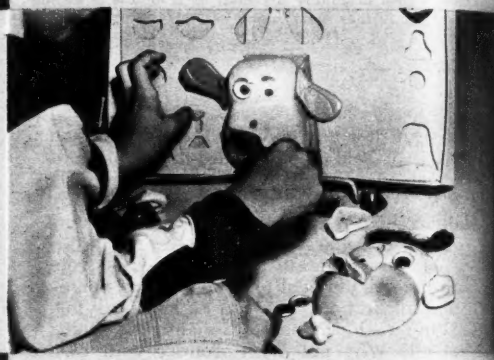
PLEASE TURN PAGE

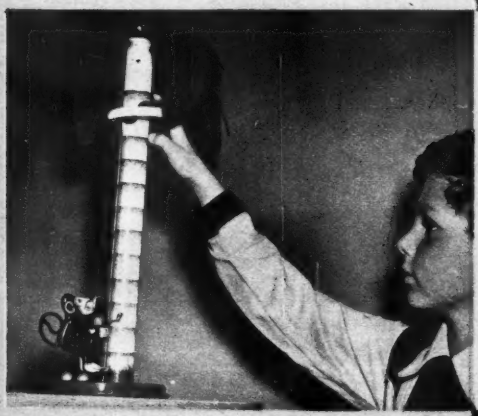


Will These Toys Hit the Jackpot?

On these two pages, with the help of the Toy Guidance Council, we have assembled some of the newest and most ingenious toys on the market. Read their backgrounds for yourself and judge for yourself, too, whether or not they answer a need in the toy field. Do you think they will make millions of dollars for their inventors?

Skyline Airport came into being when Louis J. Petion observed that children needed to think of airplanes as something other than weapons of war. So, he went to work on a magnetically controlled airport which a child can operate by switches. "To make the field look realistic I used a concealed magnet underneath. In order to control the motion of the toys to a centrally located station, I used a pantograph with a stop on top and a loop to guide the control stick. This pulls the master magnet away from the plane." After the kids become skilled in handling the airport, they can think up tricks of their own. Price: $10.





Juggle Head is the result of almost two years of research in a garage. Two ex-Army captains, Larry Sherwood and Howard Leblang, were experimenting with the use of Alnico as a magnet in children's toys. Of all their developments, Juggle Head pleased most the children they used as guinea pigs. This plaything combines a magnet with a blank mask to which the child can fix sets of ears, noses, mouths, eyes and mustaches. These have metal clips on the back which cling to the magnetized surface of the face. The partners now have a factory in Brooklyn with 40 employes, most of whom are either veterans or physically handicapped persons, turning out the toys. Price: $2.

Monkey Shines is the invention of two Buffalo, N. Y., men who served in the South Pacific during World War II. Rudolph C. Blaich and J. Alan Banzhaf saw many monkeys zoom nimbly up palm trees for cocoanuts while they were in the tropics. When they returned, they worked up this novelty which operates on the principle of counterbalance—there's nothing to wind. You just load the cocoanuts into the tree and the comical monkey scampers up and down the trunk bringing them down one at a time. There's nothing to go out of order and no sharp edges to cut unwary hands. Price: $2.

Photo by Bob Brightman

[*Continued from page* 61] and age suitability of many toys. The findings of this organization have come to be widely accepted among both buyers and sellers of children's toys. So, if your toy can be classified as progressive, its chances are much better.

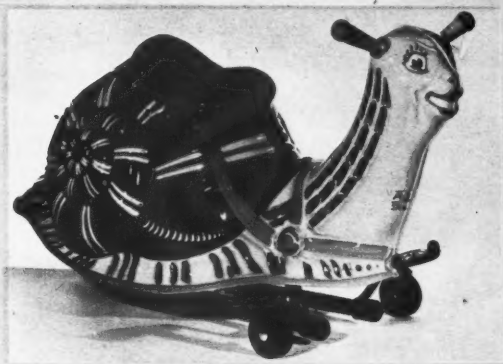
This is not so true of dolls which appeal to the basic maternal and imitative instincts. "Many of our doll ideas—perhaps almost half—come from outsiders," says B. H. Baum, president of Effanbee, the biggest doll maker. "Some of them, believe it or not, come from kids themselves."

Mr. Baum was startled once when the moppet of a friend said to him, "I want a doll with colored nails just like Mommy's. Why don't you make one?"

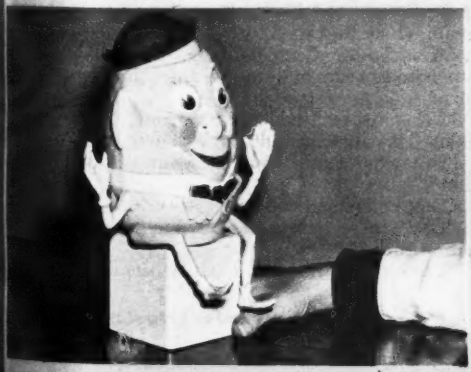
Baum acted on this suggestion, making not one but thousands of dolls with colored nails and never regretted it.

Marie Wittman, the New York music teacher who invented Dy-Dee dolls, the dolls that wet, has made a fortune on them. In years of full [*Continued on page* 152]

Humpty Dumpty **was created one morning at the breakfast table by Mr. and Mrs. John H. Wright. "We had been trying to entertain our daughter by placing an empty shell on top of the cereal box, reciting the nursery rhyme Humpty Dumpty and knocking the shell off the box. Kathy loved it. Then we drew a face on the shell and Kathy was delighted, and kept begging to see the performance again and again until the shell was completely crushed. Using this as an inspiration, we began to experiment and finally worked up a plastic Humpty Dumpty which a child can put back together again. And we've obtained patents on three other of these Playmaker Toys." Price: $2.**

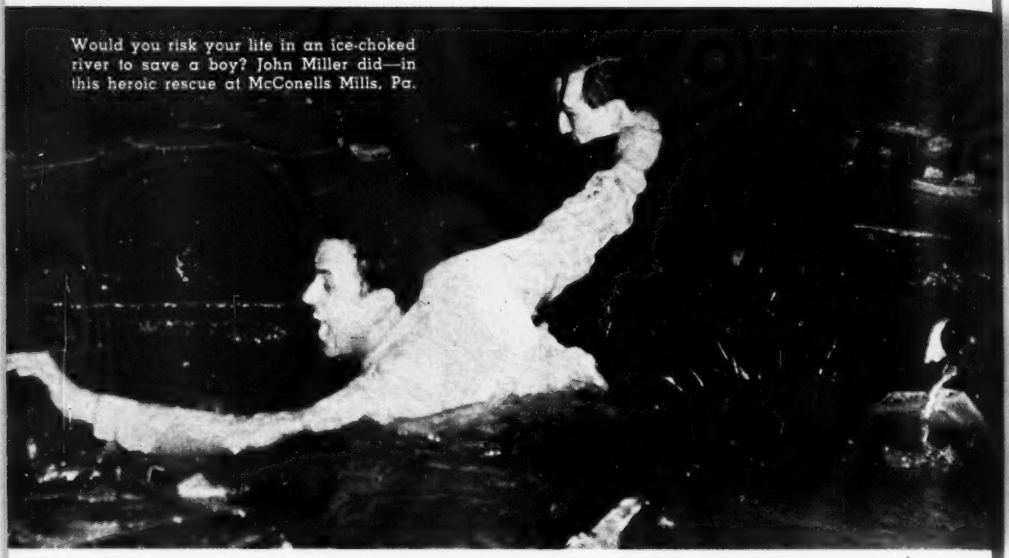


Mobo Snail **is the result of a father's desire to please his children. Harry Sebel, British designer of this toy, is the owner of a factory which makes metal porch furniture. He decided to try to make some toys for his children, using the same steel tubing he utilized in his furniture. The snail is not the first of the results—there's a very popular horse of the same all-steel construction. To ride the snail, the youngster sits astride it, puts his feet on the foot rest and his hands on the horns. Then, he simply rocks back and forth while the snail moves off just as fast as the child can rock. Children love it because it feels almost alive. It's fine for 1½ to 5-year olds. Price: about $17.**



What Makes a Hero?

By Ralph Coniston



Would you risk your life in an ice-choked river to save a boy? John Miller did—in this heroic rescue at McConells Mills, Pa.

"THERE'S a man on the tracks!"

An elderly man had fainted and fallen from the jammed platform at the 59th Street station of the New York Independent Subway just as an ominous rumble warned that the train was approaching. The crowd was stunned, paralyzed with horror. Several men rushed to the edge, then stopped short. For there was no escape from the onrushing train on the tracks below. Death by mangling under the train threatened anyone who dared attempt a rescue.

But Stuart M. Campbell, a 27-year-old traffic clerk for Eastern Airlines, did leap down on those tracks. Just as he seized the fallen man, the front car of the train entered the station. The rumble suddenly grew to a roar.

The crowd gasped—but Stu Campbell acted quickly. He rolled the limp figure into the narrow trough, only five inches deep and two feet wide, right between the rails.

Then he dived into the trough himself a few feet ahead of the unconscious subway victim. The crowd groaned as the train passed over both bodies. Fortunately, both Campbell and the old man escaped the couplers and the other dangling attachments that might have cudgeled them to death. Campbell received a Carnegie medal for his heroism.

What made Stuart Campbell a hero?

MECHANIX ILLUSTRATED sought to answer that question by locating Mr. Campbell in Coral Gables, Fla., where he is now an automobile salesman.

Campbell was just an everyday American. Before April, 1942, when he saved the life of the helpless man on the tracks, he had never acted like a hero—nor has he again, since that day.

MI asked Mr. Campbell what he thought when he saw the man topple from the platform.

"I was just excited," he answered. "I was excited because the old man was in danger."

"But what made you risk your life like that?"

Campbell shrugged.

"How do you explain your swift heroic action then?"

"I think such heroism must be the result

of some instinct," the auto salesman said.

Let's take a look at the case of William Jeffrey, a laborer of Deptford, England, who followed the fire engines to a burning house and heard a woman scream,

"My baby! My baby's up there!"

The house was a crackling hell of flame. The stairs crumbled into a heap of firebrands. The mother screamed again. Something inside of Jeffrey cramped into a hard knot of torment.

He noticed a rickety drain pipe on the house. On the instant he started up, hand over hand. The pipe shook and threatened to collapse. But he reached the second floor, broke a window and disappeared into the flame-licked smoke.

Red tongues of fire shot through the opening. Then Jeffrey returned to the window with the baby. But he needed both hands to climb down. Gripping the infant's clothing in his teeth, he started down the pipe. Suddenly there was a sharp noise. A weak spot in the pipe had broken. For a moment Jeffrey swung helplessly in mid-air. Then he scrambled a few feet farther down to a stronger part of the pipe and safely completed his descent.

Jeffrey, like Campbell, received a Carnegie medal, but neither could have foreseen such a reward. And they showed the same heroic reaction in a crisis, the same instinct to save a life.

What is this instinct that apparently made heroes of both Campbell and Jeffrey? Is it in you, me—everyone? Would you act like a hero in a similar crisis?

In a search for the answer to these questions, MI consulted three psychiatrists, all noted experts in the science of human behavior.

Dr. Edward A. Strecker of the Pennsylvania Hospital, Philadelphia, consulting psychiatrist to the Armed Forces, was one of these. He told us that some heroes were inspired solely by a desire to show off.

An example of such a case was Private X. One night as his platoon was patrolling in North Africa, the men heard enemy soldiers approaching.

"Hit the dirt—and keep quiet!" the lieutenant ordered.

Private X ignored the command and dashed forward firing his gun. Fortunately the Nazis were few. Private X killed three, captured eleven—and became a hero.

But he might have caused the death of his entire patrol by his rash desire to show how brave he was. A week later, in the hot fight for Kasserine Pass, the man next to our hero was killed. This close brush with death completely unnerved Private X. He was returned to the States—another psychiatric casualty.

This type is not only a poor soldier. He is the one who always misses his bus at the end of the leave, does "port arms" instead of "shoulder arms," raises his rump during combat training and gets it perforated. He never gets used to Army life or learns to work on a team—so he never becomes truly a part of his outfit. Sooner or later he breaks under the strain and becomes a mental case.

All the psychiatrists MI consulted agreed that "sense of obligation" was the most common well-spring of heroism. This obligation might be to friends, the Army, America or mankind.

Dr. Strecker said heroism is usually based on the feeling of "oneness" or identification with others. Here, then, is the explanation of the instinct that Campbell mentioned. The psychiatrists call it "herd instinct"—the subconscious desire for race preservation. Everyone of us shares this emotion, even if we only show it by murmuring sympathetically, "What a pity!" when we read of a death.

If you are normal, you're more likely to be a hero than if you are psychoneurotic, according to Dr. Daniel Blain, medical director of the American Psychiatric Association. Concern for the welfare of mankind

Fire in her home made Mrs. Charles L. Bishop of Minneapolis a heroine—to her pets. She braved fierce flames to get the cat and save two dogs.

Weary hero of a dramatic rescue attempt, Bill Yancy comes up with the body of little Kathy Fiscus. Dotted line, below, shows rescue shaft. Pit is at right and fatal well, now covered, is marked by arrow. Would you have slid down 98 feet of 14-inch pipe to reach the child?

is likely to become submerged in abnormal persons whose poor adjustments to the world cause their anxieties and fears.

Lieutenant Colonel Eugene R. Inwood, chief psychiatrist of Walter Reed General Hospital, the Army's main medical center, spoke of a regimental commander who was decorated for heroism during the European campaign. He repeatedly exposed himself to death as he led his outfit in forcing a river crossing in France. This officer, a well-adjusted man and father of four children, was impelled by a strong sense of duty which demanded that he ignore personal safety, Colonel Inwood observed.

Another example of almost superhuman bravery happened when an Army bomber crashed with three flyers. Charles Marchant, who saw the plane fall, found two of the men thrown clear. But John Huggan, the air gunner, was trapped inside, unconscious. Fire broke out. Despite 20-foot flames, exploding machine-gun ammunition and the strong probability that the bomb load might go up at any moment, Marchant climbed up on the wing to reach the door. The heat was too intense. But, instead of giving up, he mounted the fuselage. More ammunition exploded. Facing down death, he reached into Huggan's compartment and pulled the unconscious flyer out, down to the ground, and then away from the plane. A matter of minutes after Marchant got clear, the plane blew up.

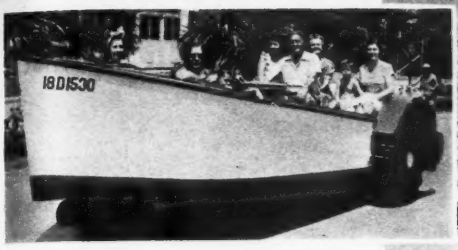
The story behind heroes such as Campbell, Marchant and the regimental commander confirm the psychiatrist's belief that the seeds of heroism lie in your concern for your fellow man. In sentimental terms (which, after all, are merely human terms), the basis of most heroism is love—love in its widest meaning, the love for mankind which everyone shares.

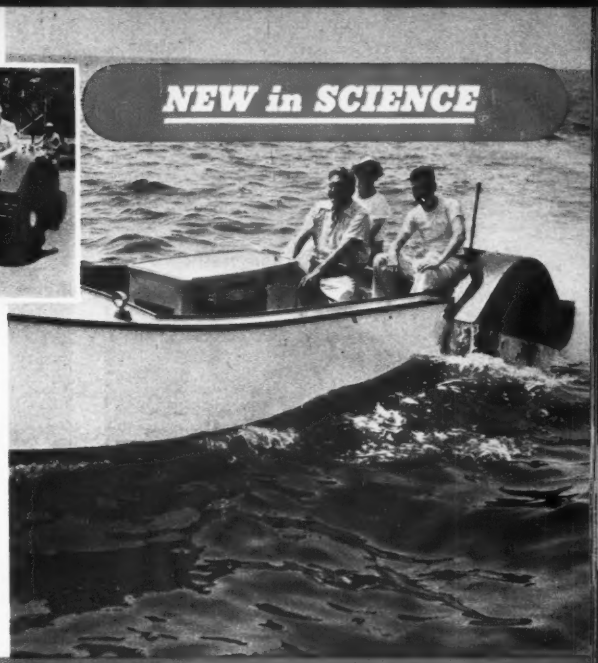
Heroism is not exclusive to any nationality, race, sex or class. Both bums and bluebloods have joined the ranks of heroes. Those same instincts which have bred heroism in others from all walks of life and from all corners of the earth are in you, too. But, faced by a choice between your own safety and the chance to save the life of a fellow human being, would you hurl yourself on the tracks in front of the onrushing train, dash into the flames, plunge into an icy river, brave an imminent bomb explosion?

It's true, our modern civilization has nearly smothered all love of mankind, all concern for the welfare of others with which we were born. Occasionally, it still bursts forth. Sometimes it appears as philanthropy, sometimes as heroism. As long as men and women roam the earth, though, someone will always be ready to sacrifice himself that others may live.

Today, it may be a total stranger. Tomorrow, that brave new hero can be *you*. •

NEW in SCIENCE





Automoboat takes the family for a spin on land or sea. It's an amphibious craft with heavily-ribbed tires which paddle-wheel it through the water. Above, Herbert J. Farrar, a retired aircraft worker gives the 20-foot vehicle a workout along the highway. It took him two years to design and build the boatcar. Right, he tests it in Florida waters.

Threadmaster saves time and effort in getting the thread through the eye of the needle. First, the needle is dropped in the top of this inch-long device. Then, the thread is slipped into a slot. A plunger pushes a small hook through the eye and when it is released, draws the thread through, too. Then, the needle can be lifted out and threaded, ready for use. 379 Fifth Ave., New York, N. Y.

Clay Pictures: German engineer Curt Bayerlen has developed a method of translating photos into sculpture. The shadow image of a screen is projected on the subject's face. Then, she is photographed by three cameras. Through a stereoscope, right, he follows the screen lines of the composite picture with a pin while an instrument connected to it works out the portrait in plastic clay. Compare subject with model, inset, for proof of his expert workmanship.

PROSPECTING for GOLD in New York City

1 This Assay Office workman is not one of the Gold Dust Twins but that's gold-dusty dirt he's shoveling into government bags.

THERE'S a spot among the big city's skyscrapers where men dig for gold. But it's not the usual kind of mining. It's done in floor cracks, wall ledges, between toes, under fingernails and in clothing.

In the New York branch of the U. S. Assay Office, small particles of gold are lost in the brick-making process. In the course of a year this "dust" can run into a tidy sum, so the entire factory is scoured and everything that could possibly serve as a hiding place for a gold molecule is shaken down. Each worker must shower after a day's work, but the water doesn't go down the drain; it's trapped on the floor below for screening. Is it worth the trouble? Between $75,000 and $100,000 in gold is recovered in this way every year. •

MI photos by Alfred Eris

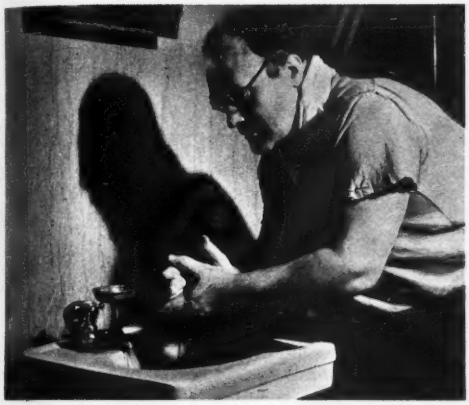
2 Smokestack, located in the heart of New York, is part of the Assay Office. They make sure no gold goes up in smoke, though.

5 Eventually all the men's old clothing ends up in this furnace. Then the ashes and the fumes are collected and examined for gold.

8 Storage tanks hold thousands of gallons of waste water. Later, the residue is passed through a vibrating screen which sifts it.

3 Melt number is stamped on each of these bricks. This particular cache of 20 gold-bricks is worth a mere $280,000 to the U. S.

4 Oh, to be an Assay Office sweeper with finder's rights! Every bit of dust is swept up and carefully checked for gold content.



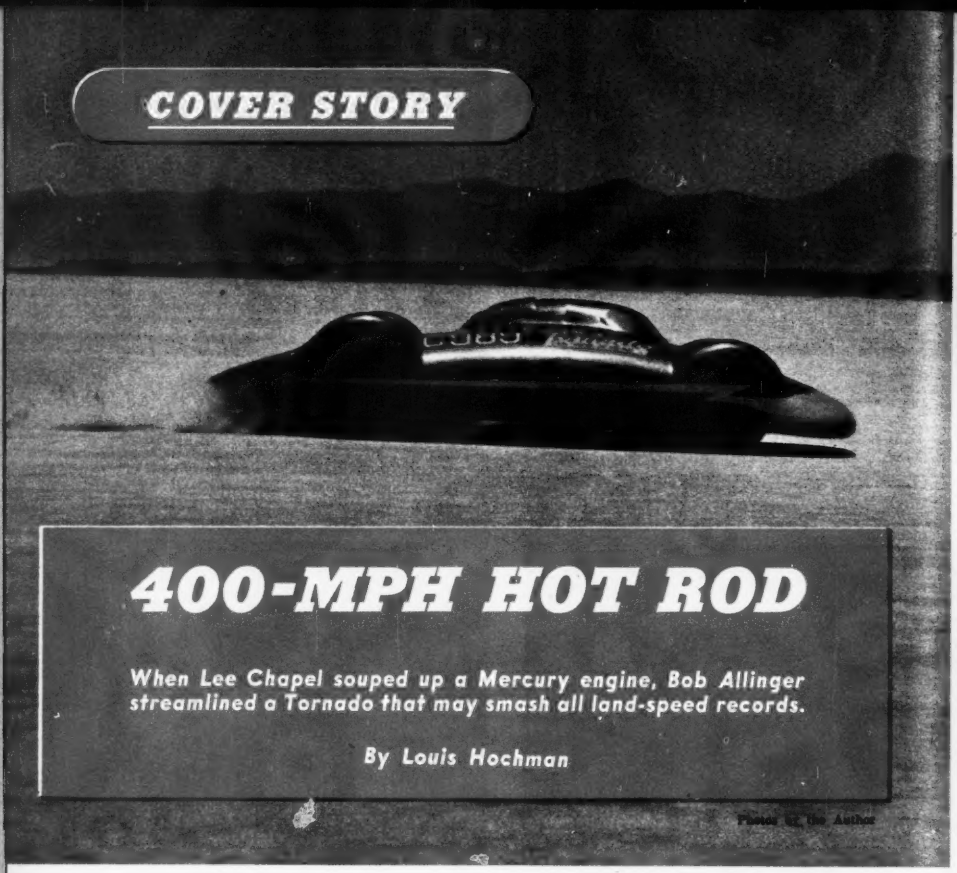
6 "Cleanliness is next to goldlessness," say officials. So every worker washes thoroughly, then water is passed through sumps.

7 More gold water down the drain! If workmen don't wash behind ears, instead of potatoes they'll find gold nuggets growing.

9 Even the soot from the walls of the melting room is vacuumed off and carefully tucked away in bags for later gold dust inspection.

10 These bags are almost worth their weight in gold dust. They are sent to a smelting firm which made highest reclaiming bid.

COVER STORY



400-MPH HOT ROD

When Lee Chapel souped up a Mercury engine, Bob Allinger streamlined a Tornado that may smash all land-speed records.

By Louis Hochman

Photos by the Author

A homemade hot rod may soon be the hottest thing on record—hot enough to burn up the world's land-speed mark of 394.196 miles an hour. That sizzling pace, set by John Cobb of England on Sept. 16, 1947 at Bonneville, Utah, in his special Railton Mobil racer, looked good for a long, long time. But now Bob Allinger feels that with a few changes the dream hot rod he built in his backyard can hit 400 mph!

The start of this super hop-up job—featured on these pages and on MI's cover—was a stock Mercury engine. Lee Chapel of Oakland, Calif., redesigned this powerplant into an overhead-valve engine that develops 240 hp and revs up to 6600 rpm.

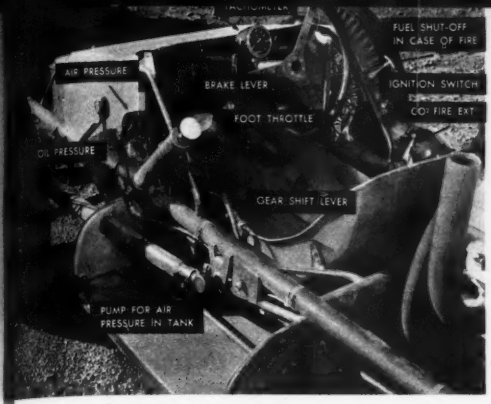
Then he got Allinger, a noted speedboat and race-car designer who introduced midget auto racing in California, to build a streamlined speed body around the engine. Bob got busy on the big drafting board in his backyard workshop at Saratoga, Calif., and worked out his ideas for the ideal hot rod. With no helping hand except from the power tools in the garage shop he built himself, Bob turned out this super streamliner.

This car, which he aptly christened Tornado, packs all its punch into a midget frame only 41 inches high and 16 feet long, with a 103-inch wheel base.

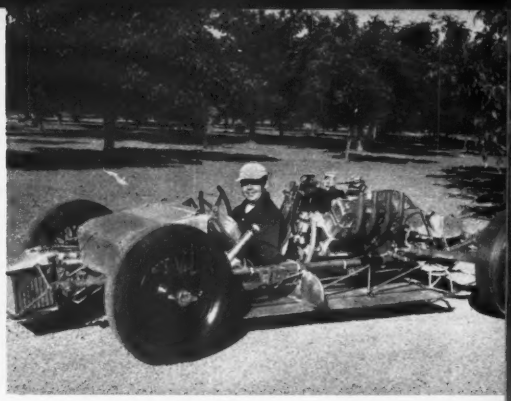
Like any real hot rod, this dream job has quite a few second-hand parts specially adapted from standard-make cars. The water radiator in the bow came from a Rolls-Royce, the front axle from a '41 Ford and the steering gear from a Franklin.

In the car's first test last summer on El Mirage Dry Lake (see fast-action shot above), Ted Ayers rolled it at 130.5 mph—not bad for any racer on a maiden run. Both Chapel and Allinger expected the car to tear off at a 200-mph clip even then. They blamed its relatively low speed on the wrong fuel mixture for the dry, 120-degree heat of the desert.

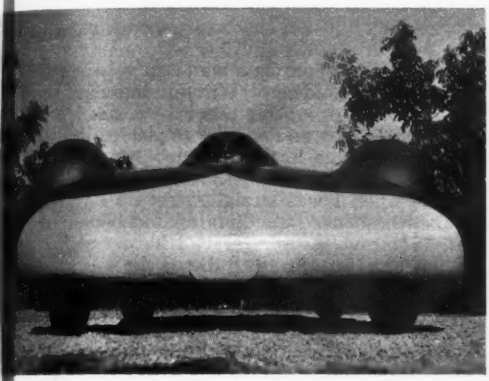
Next summer at Bonneville they hope to show what a Tornado really can do when it breaks loose over those long, flat salt beds. With the same basic design but a stouter chassis and an Allison aircraft engine replacing the old Mercury motor, Bob thinks that 400-mph record will be a push-over. •



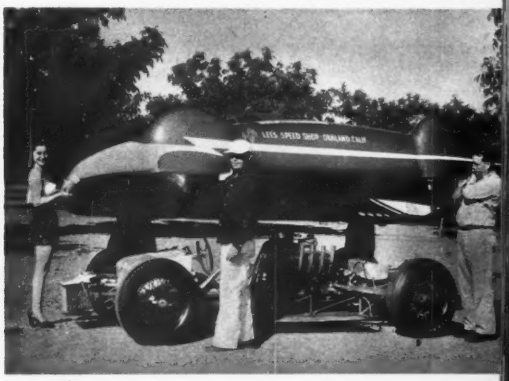
Here's a stripped-down view of the Tornado's snug cockpit. Pipe at right is one of eight exhausts.



Bob Allinger tries out the skeleton of the super hot rod that he dreamed up in his backyard shop.

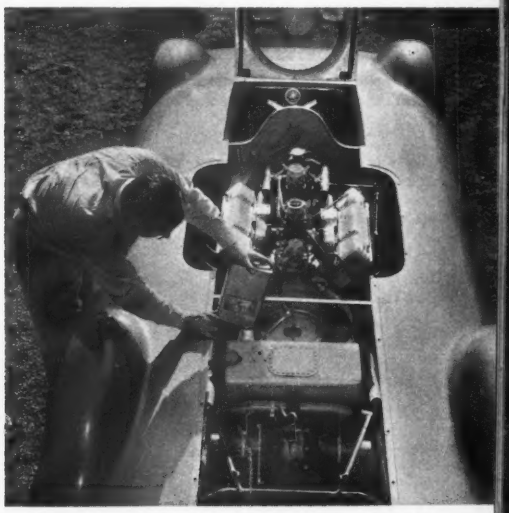


Head-on, the gleaming new streamliner looks like some giant bug as Bob pilots it through a grove.



Pat Epperson, a California beauty queen, Allinger and Chapel help show how easily the body lifts off.

Top view reveals the Tornado's remarkably sleek, racing lines, broken only by the exhaust outlets.



Chapel gasses up his car's tiny fuel tank, which holds 4½ gallons—enough for one rocketing ride.

A MONEY-MAKING

idea

Miss Pillman welds a clasp on geranium leaves she's turned to silver. Three crosses are dogwood.

First step in converting a geranium into jewelry is to daub the leaf with plaster and make it very rigid.

After she's put the hardened leaf in a cylinder full of plaster, Miss Pillman bakes it in the oven.

I Turn Leaves Into Silver

By Marie Eloise Pillman

A happy accident happened to me 12 years ago while I was an assistant in a St. Louis dental laboratory. Today, because of that accident, I'm part owner of an intriguing business that's turning leaves into silver and gold.

I was busily preparing a wax impression of a tooth for a gold cast. Without noticing it at the time, I dropped a bit of the casting investment—a material similar to plaster of paris—on a zinnia in the bouquet that I'd left on the table.

Later, when I was straightening up my workbench, I saw something on the bouquet. Some of the plaster had hardened on a flower petal—just as it did on the wax impression.

This excited my curiosity and I soon forgot about quitting time. I quickly painted all the petals of the zinnia with investment. Then I treated the rigid flower exactly as if it were the wax model for a tooth.

I put the zinnia in a cylinder with investment and let the wet mixture harden. After that, I rolled the plaster cylinder into the lab furnace and baked it at a high temperature.

I could hardly wait for the baked plaster to cool off enough for me to see what happened to the zinnia inside. When I cracked open the plaster, I was disappointed. The flower had burned to a crisp and crumbled into black soot when I touched it.

But as I poked about in the molded hollow I discovered the flower's delicate lines had been impressed in the plaster.

I continued my experiment and took the next step in casting a tooth—I poured molten metal into the cavity. My reward for investigating my little investment was revealed when I removed the cast and found I'd turned the zinnia into a metal flower of rare beauty. All the tiny details, including the terminal hairs at the end of the petal, were exquisitely reproduced.

I was delighted with my discovery and started turning other flowers into metal. The more intricate the design of the plant,

A dental aide, casting a false tooth in the lab, dropped some plaster on a flower—and picked up a fine new career in jewelry.

the greater challenge it offered. But "lost-wax" casting—so called because the wax pattern melts away completely in the process—captured, and presented in metal, nature's most delicate designs, I found.

My friends told me that I should commercialize my hobby. I smiled a little wistfully, I guess—and figured they were only trying to be nice and flatter me for my handiwork.

Then the Eisenstadt Company, manufacturers of jewelry, got wind of my work. They invited me to join their organization and do my special type of casting in their lab.

One day while I was working for the Eisenstadt firm, Walter Fett, a salesman for a New York manufacturer of precision castings equipment, called on business and apparently was impressed with my work. Later he gave me a tip about an interesting job—teaching the "lost-wax" process, the one I was using, to manufacturing jewelers. So in 1944 I went to New York and set up the Jelenko School of Precision Casting.

While I was in town, I enrolled at Columbia University, since there was still a great deal to learn about my work and wanted the best help I could get from technical science. I took courses in metallurgy and related studies.

I had told Fett about my flower experiments and we often discussed the problems and possibilities of my work. Finally we decided to go into business together. I felt that I had mastered the casting process well enough to make gold and silver jewelry from leaves and flowers.

After looking about for suitable quarters to start our project, we eventually went back to St. Louis and set up shop near Grand Avenue in the center of town. We equipped a little factory with the latest model high-temperature baking oven and other equipment for casting fine metal.

We named our firm Cerecast—from the Latin word *cera* for "wax" plus the English word cast, to indicate the "lost-wax" process that's the key to our leaf jewelry. [*Continued on page* 166]

The baked cylinder is fitted into the centrifugal force machine, to inject molten metal in the mold.

The leaf-maker finishes off rough spots after casting a silver "jewel" that improves on nature.

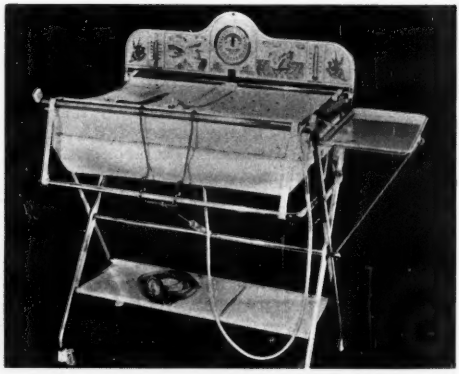
Can you tell the original leaf from Miss Pillman's finished metal gem? Bright one on right is hers.

NEW for the BABY

Chewing Bar lets baby cut his new teeth on his crib with no danger from chipped paint or splinters. Teething Rail, a U-shaped strip of tough Tenite plastic, snaps snugly over top of the guard gate. Price, $1.98. Nursery Plastics, New York.

Five-in-One Buggy converts from carriage to crib, playpen, stroller or auto baby-carrier. Jonathan Elmer invented the Pramquin to do quintuple duty for his two little girls. The unit telescopes out to form a full-sized square pen but folds into a neat 28-lb handbag. Price, $59.95. Luscombe Engineering Co. of North Wales, Pa.

Wetproof Creepers have "accident" insurance built into Junior's little garments. Stain-resistant Vinylite plastic film lines the cotton-knit panties and saves mother laundry problems. Metal fasteners make changing diapers just a snap too. Belted model, shown here, costs $2.95. Miller Art Mfg. Co., N. Y. C.



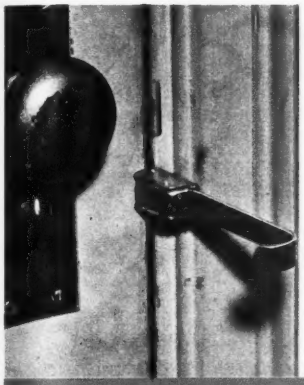
Better Bath for baby and an easier time for mom are assured by this new tub setup. Lever lowers infant into water or lifts him out. Top surface can become a safe dressing table. Scale dial on Bathmaster's dash tells his weight, thermometers show bath and room temperatures. $39.95. Master Juvenile Products, Walker Valley, N. Y.

Baby 'Chutists haven't hit the silk. They're just jumping with joy in their harness exercisers—fittingly named Johnny Jump Up. Hang the rig on a doorway, pop in the tot and let him hop himself to a healthy body. It's tip-proof and carries weight on tummy, not the spine. $2.98. Educational Toy Co., Minneapolis, Minn.

THIS MONTH'S **prize gadget**

Photo by Robert Brightman

Portable Door Lock



FIRED from a South Carolina hotel, an angry porter stole a pass key. That night he broke into a room, attacked and murdered a young girl. The porter's crime shocked a Mount Vernon, N. Y. policeman and impressed him with the need for a portable door lock. The cop, Melvin Rauch (now retired), began tinkering in his home workshop and finally turned out a practical model for a handy lock you can carry around in your pocket to safeguard yourself against prowlers, no matter where you are. Hooking easily in any door's strike-plate and fastening tight by slide-latch, his $1 door lock should be a great boon to apartment dwellers, traveling salesmen and vacationists. For making one good thing out of something bad, MI is sending Mr. Rauch another good thing—a $50 greenback to lock up with his "Fool-Thief" gadget. •

Set the portable lock on the latch, above, and you're safe against any intruder in the night.

Inventor Rauch uses a workbench vise to test the spring tension in a completed lock's slide-latch.

WIN $50

Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to the Gadget Editor, Mechanix Illustrated, 67 West 44th Street, New York 18, N. Y. Each month the best entry, in the opinion of MI's editors, will be awarded a cash prize of $50.

Game Birds Guaranteed!

Rocky, a Weimaraner, and Belle, a Pointer, team up on this one while the author walks up for his shot.

A hunter's dream come true . . . a long open season and no bag limit. And right in your own backyard.

By Raymond R. Camp
Rod and Gun Editor, New York Times

WHO says there's a shortage of upland game birds! Not where I've been hunting. I kicked up eight pheasants in a little more than an hour my last time out and I don't think that can be called scarcity. Moreover, I can hunt this stretch until the end of February; the season started October 1. And there's no bag limit.

Sounds like a hunter's heaven and it is. You needn't write in to ask where I went. I'll tell you without coaxing. And what's more I'll tell you where there are many other spots just as good.

The scene of my particular jaunt was John Ballantine's Ballamor Preserve, 520 acres of excellent pheasant and partridge cover in Southbury, Conn. Sure it was a preserve. But don't scoff. I had some really wild hunting. Those birds weren't planted; they had been released weeks before and had set up light housekeeping there, coaxed to stay by promise of abundant refuge and food supply.

The modern bird preserve, if run correctly, furnishes the only satisfactory answer to the problems of diminishing wild birds and increasing hunting pressure. The British were among the first to realize this. For many years they have had their gamekeepers and preserves where the wildlife has been stocked and encouraged to multiply naturally.

Photos by GP

The American system does not call for an expensive lease as does the British, however. If you want a good day's pheasant shooting or even a half-day, you can have it and it will not make a heavy dent in your bank account.

The typical preserve contains about 500 acres of woods and fields and the average charge for a day's shooting for a party of three hunters is $60. For this sum you are guaranteed twelve pheasants and if you do not have a dog of your own, the preserve will provide a good pheasant dog and a handler. While $60 may seem rather steep, you will find that if you buy 12 pheasants in a butcher shop they will cost you almost as much, so in addition to the birds you are getting a full day of good sport.

Some critics of the preserve system ridicule shooters who patronize such layouts. They claim that such hunting is completely artificial, and that it's like going out into the chicken yard and shooting a dozen hens.

1 Preserve birds are reared in large breeding pens where they are permitted plenty of flying exercise to keep them strong and healthy. When needed for stocking, they are caught in nets, carried to the field in crates.

2 To put this cock pheasant to sleep for "planting," its wing is extended and its head is carefully tucked underneath. Then it is placed gently in the brush. Length of sleep depends on the air temperature, humidity.

3 This pheasant is alive but sleeping, posing for the camera. The dogs came up close before pointing since the bird's scent was confined to a very small area due to its inactivity and lack of trail in the grass.

4 Rocky found this wild bird on the other side of the field while the author and his photographer were busy with pictures. Time out was taken so the pheasant could be flushed and shot to be added to the bag.

Ballamor Preserve is managed by capable John Ford who poses here with Rocky and one of his charges. Acres of bird pens are in the background. Note how a good hunting dog ignores the birds in the pens, even the pheasant Ford holds in his hand.

With the spring release pen demonstrated here by the author, the bird is placed in the wire-covered box, above, and the covers are held down by a trigger. When the dog points the pen in the grass, the trigger is pulled by a string.

That isn't so. Preserves will give you any type of hunting you desire.

To the old timer who can't get around as well as he used to, or to the disabled sportsman, the preserve has been a real boon. There he can enjoy "simulated" wild shooting and not have to walk ten miles through heavy cover to get it. For such clients the preserve operator will set aside a small but adequate field, sometimes only six or eight acres in area. In this he will *plant* the number of pheasants required. The dog handler knows where these birds are located but the physically handicapped hunter does not, so he enjoys the dog work and the element of surprise.

Several methods are employed to insure that the pheasant will remain where it is *planted*. One method and a simple one is to place the pheasant's head under one wing, holding the bird firmly but lightly, and to rotate it in a gentle circle for a few seconds. This puts the bird to sleep and if placed on the ground under a bunch of grass it will remain there for several hours, at least until the dog approaches. Another method calls for the use of a spring release pen. This is a small wire box with a spring cover. The pheasant is placed inside, the box is hidden in the grass, and a long string is run from the release lever. When the string is pulled, the lid opens and the pheasant takes to the air. These methods are followed in planting any of the other species of upland game birds but pheasants are the most popular, perhaps because they loom up larger in the roasting pan.

Some preserves conduct pheasant drives similar to those popular in Europe. These are not for the average sportsman, however, for they are costly and usually do not provide as large a game bag.

The most popular form of preserve shooting, however, is that which most closely follows natural field shooting. Birds are released at various covers regularly and the operator knows there are always from 50 to 100 birds scattered over his area. The shooters then set out with their dogs and when they have obtained their self-imposed bag limit (usually depending upon their pocketbooks), they return to the clubhouse.

The majority of the preserves have comfortable accommodations for patrons who want to come out the night before the shoot and in most instances such accommodations are operated without profit.

Why not try preserve hunting! For the names of the preserves in your state, contact your State Department of Fish and Game. Visit a few of these with your dog, specify the type of hunting you want and enjoy upland bird hunting at its best. •

Dr. Howe, far right, shows Walter Toscanini, the maestro's son, some of the 24 big batons he made before turning out the perfect magic wand for the master's $100,000 concert.

hobby
HALL OF FAME

DR. HUBERT S. HOWE

Magic-Wand Maker for Maestros

THE great Toscanini was upset. He couldn't find a baton—a special baton big enough to be seen by nearly 1000 performers in his orchestra. He had promised to conduct a mammoth benefit concert at Madison Square Garden for the Red Cross on May 25, 1944.

The famous maestro confided his trouble to his old friend and personal physician, Dr. Hubert S. Howe. The doctor, a top nerve-specialist and a keen craftsman, set to work in the small shop in his Manhattan apartment. He started combining ebony, mahogany, satinwood, purple heart and other woods with cork, plastic and leather.

Finally, after creating two dozen batons, he conjured up one that quickly wafted away all Toscanini's trouble. This beautiful, $30\frac{3}{16}$-inch birch wand was perfectly balanced at the handle and—by the doctor's own secret process—was covered with 50 coats of white plastic paint until the stick looked like pure ivory.

With this wonderful baton, Toscanini staged a terrific performance that gave the music master new glory and the Red Cross $100,000. The magic wand itself brought $11,000 when auctioned at the benefit.

Since then, Dr. Howe has made 100 batons for the conductor at his request—all $19\frac{7}{8}$ inches long but no two alike—and many more for Alfred Wallenstein and other noted maestros. It's a fine hobby, the doctor thinks—helps him relax from worry about his patients and means something to other people. Take Toscanini, for instance—"I can find no words adequate to express my gratitude." For the maestro's magic-wand maker there's enchantment enough in those sincere words of praise. •

Arturo Toscanini, left, uses up about 20 of Dr. Howe's wands every year. Rapping on the music rack causes this high mortality. In his apartment workshop, right, the neurologist sands another baton for the maestro.

Over hill, over dale McCahill hits the bumpy trail in this new Nash Ambassador. He climbed everything but trees and seems to be considering even that in this shot.

MI Tests the 1950 Nash

By Tom McCahill

I'VE met the new Nash and I think it's America's most versatile car.

Mrs. Astorbilt and her liveried chauffeur, or Willie Pintail, hunter and prospector, would be equally at home in one. No Nash owner will ever have to worry about a roof over his head; with the car's bed feature, he can be as independent as a duck in a flood.

The big Nash selling pitch is that while these are cars for sportsmen, they still retain the best features of the old family bus. But, before going further into its mobile flop-house characteristics, you might want to know more about the Nash as an automobile.

In appearance, both the Nash 600 (called the Statesman for 1950) and the Ambassador are basically the same as the 1949 models. Both cars have undergone mechanical changes of minor importance, however. The Ambassador has had a revalving job which gives it more punch and it also has the G.M. Hydra-matic transmission. Nash made some sort of a deal with G.M. which involved swapping the rights to the Nash Weather-eye ventilating and heating system for the use of G.M.'s Hydra-matic. This makes Nash a triple-threat car for now it can be bought with a choice of three different drives—conventional, over-drive or Hydra-matic. The compression ratio of the Ambassador has been raised a fraction, too, and this has increased the torque and performance. The horsepower now is 115 instead of 112.

High boots were in order the day I wheeled Tess the Timid Tiger (my Ford)

Benson's retriever (in trunk) and Tom's Joe (the black hound) watch as the men pile equipment into ample trunk.

Tom likes the idea of snoozing on the reclining half of the front seat. Driver had better watch out for the glare from that noggin!

While McCahill waits his turn on the proving ground, he clocks other cars. Tom found Ambassador's top was 89.11 mph.

Mosquito screens fit like gloves and don't hamper raising or lowering of windows. They really ban the bugs, too.

Under the hood, Tom looks over the Ambassador's six-cylinder, 115-hp engine. That's the latest type oil-bath air cleaner he's fingering.

Nash still features Uniscope on wheel which holds most of instruments. Convenient bin, center, replaces glove compartment.

into the Nash proving grounds at Burlington, Wisconsin. The next two days were spent in the experimental garage with all noses glued to the windows looking for a break in the weather. On the third day, it tapered off to a blinding downpour so out we went for some trial runs.

The Nash track is not as steeply banked as some of the others I have tried, so I must admit that taking those turns at open throttle had me a bit nervous on occasion. I discovered immediately, however, that the big Ambassador I was testing was a lot more car than its predecessors and the Hydra-matic transmission didn't seem to slow it down in the least. I made a number of speed tests but since I was running in an inch of water at times, I decided to come back at a later date for more accurate runs.

Now, while we [*Continued on page* 143]

SPECIFICATIONS

MODEL TESTED:
Nash Ambassador, four-door sedan.

ENGINE:
Valve in head, six cylinder, displacement 234.8, bore and stroke 3⅜ by 4⅜, 115 hp, compression ratio 7.3 to 1.

DIMENSIONS:
Wheelbase 121 in., length 210 in., width 77½ in., height 63 in., front tread 54 11/16 in., rear tread 60½ in., fuel-tank capacity 20 gal., tire size 7.10 by 15.

PERFORMANCE:
Tests based on many runs for each figure
0 to 60 mph (Hydra-matic)—16.19 sec.
10 to 60 mph in drive range—16.15 sec.
10 to 60 mph starting in low range and shifting to drive—15.1 sec.
30 to 60 mph—11.3 sec.
0 to 70 mph—24.2 sec.
Top speed—89.11 mph.

SPEEDOMETER ERROR:
At 59.6 mph, speedometer read 60 mph.

Gadgets Trap Drunken Drivers

Walking a straight line isn't proof of sobriety any more. New alcohol-detecting machines check blood, breath and vision, too.

By Morris Weeks, Jr.

IT was after midnight when State Trooper Powell reached the scene of the accident. Two cars had collided; no one had been killed but two persons were hurt and the cars were ruined.

One driver had been on his own side of the road, traveling about 40 mph. The second, coming the other way, had swung out to pass a truck and had hit him almost head on.

Another case of drunken driving? Probably, thought Powell wearily. Then, he began to ask questions.

Driver A looked intoxicated. He talked vaguely, couldn't navigate a straight line, even had trouble thinking. His pupils were dilated and his breath smelled of liquor. "Wife and I went to dinner," he mumbled. "Played bridge. Huh? Yes, had a cocktail. And a highball later. But—thassall."

Driver B also had a liquor breath, but he behaved better. He could walk a straight line, talk convincingly: "Why sure, Officer. Me and the girl friend been out doin' a little dancin'. You know, one place then another. We took a little beer, sure. Coupla bottles each, maybe."

Powell considered. If A was as drunk as he acted, his guilt was self evident. But his behavior *might* be traced to shaken nerves or an injury. Powell had seen innocent men convicted on just such flimsy evidence.

B seemed almost sober and thus, perhaps, blameless. But, there again Powell had seen really intoxicated men shocked into temporary sobriety by a crackup—plus the knowledge that they were under observation. And later, in court, wholly sober, such men could be hard to convict on a policeman's unsupported word.

What should Trooper Powell do? Well, he was lucky to be able to turn to a new and remarkable machine called the Alco-

Getting plastered for science: these two policemen hit the bottle to test the Drunkometer, a gadget which measures the alcohol on your breath.

Color of balloon in hand of more-or-less sober cop determines degree of inebriation. Nobody needs balloon to show condition of guy at right, though.

Here's the Drunkometer being demonstrated before a class of traffic officers from all over the U. S. attending Northwestern University Traffic Institute.

Inventor Leon Greenberg, left, shows his Alcometer to New York officials. This machine requires no balloons to reveal alcohol content of the blood.

meter. Invented by Dr. Leon A. Greenberg of Yale University, this machine does just one thing: by sampling the breath of anyone who has been drinking, it reveals the concentration of alcohol in his blood. Unimpressive? Just wait.

Even as the ambulance screamed up to take the injured passengers away, Powell was shepherding his problem drivers toward police headquarters. There, he showed them the Alcometer—a gadget the size of a table radio, but less complicated—and explained that if they agreed, it would test their degree of intoxication. They did agree, so Powell touched a button to warm up the machine.

Two minutes later, Driver A breathed once into a plastic tube projecting from the Alcometer. [*Continued on page* 142]

Drunk Indicator is still another gadget for catching up with the drunken driver. This device tests only the visual coordination of the motorist.

Lined up in front of Farmer West's carriage house are vehicles that were in vogue a century ago: pie-top delivery wagon, extreme left, gilded hearse, 1849 model of a station wagon and rear end of an open freighter.

1949 Farmer Lives in 1849

By Grady Johnson

"I'M like a bird flying backwards," 73-year-old Farmer John W. West tells visitors to his place. "Don't care where I'm goin'—just wanta remember where I been."

Ten miles south of Atlanta, Ga., on 70 acres of Civil War breastworks along the Flint River, Farmer West has flown a full century backward across the calendar. Single-handed he has recreated a self-sufficient farm of 100 years ago—an ancient, homemade farm with hand-hewn, mud-chinked buildings in which he lives and works with crude tools exactly as other rural Americans did in 1849.

Twenty-one years ago, West realized that he was one of the vanishing links between the era of the handcraftsman and the age of the machine. He started rummaging through attics and barns all over North Georgia to round up other relics he could use in realizing his dream of bringing grandfather's farm back to life. His enthusiasm for that golden handicraft age has resulted in the most complete collection of "living" history in the South.

If you turn off U. S. Highway 41 before approaching Jonesboro and take a look at West's farm, you will see cotton plucked from the stalk, carded, spun into thread then hand-woven and sewed into finished garments. You will see leather from rawhide turn into shoes on straight lasts, and many other "miracles."

"My family always said I'd gone crazy over oldtime farming," West chuckles.

If "flying backwards" is crazy, a lot of people who queue up at 50c a head to see Farmer West living in 1849 and enjoying those good old days are going to be sorry they're not a little looney, too. •

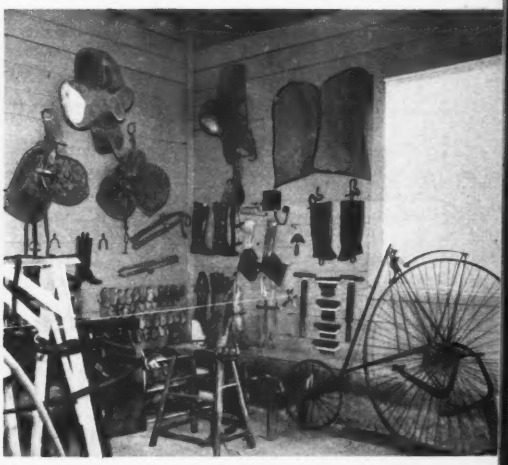
West uses a hand-powered "lathe" to shape timber in his 100-year-old, homemade furniture factory.

When West needs shoes, he can make them himself in his cobbling shop—just as the oldtimers did.

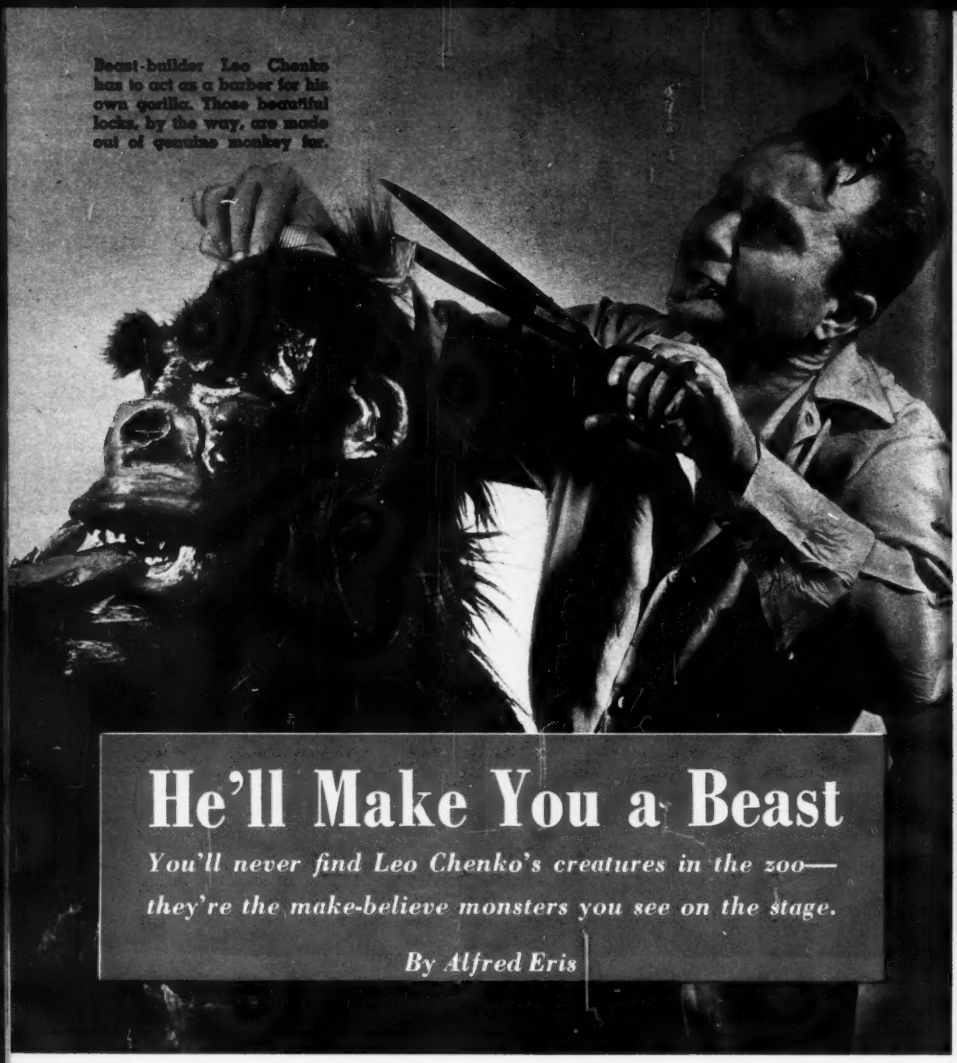
For a "new" rifle, the old farmer bores a barrel by working the handles of the long wooden screw.

Here are some of the fancier flintlocks, pistols and other antique arms in West's gun collection.

Milk is churned near the open hearth that serves as the kitchen stove. Wall oven is back of chair.



Side saddles at left and a high-wheeled cycle at right stand out in the 1849 farm's harness room.



Beast-builder Leo Chenko has to act as a barber for his own gorilla. Those beautiful locks, by the way, are made out of genuine monkey fur.

He'll Make You a Beast

You'll never find Leo Chenko's creatures in the zoo—they're the make-believe monsters you see on the stage.

By Alfred Eris

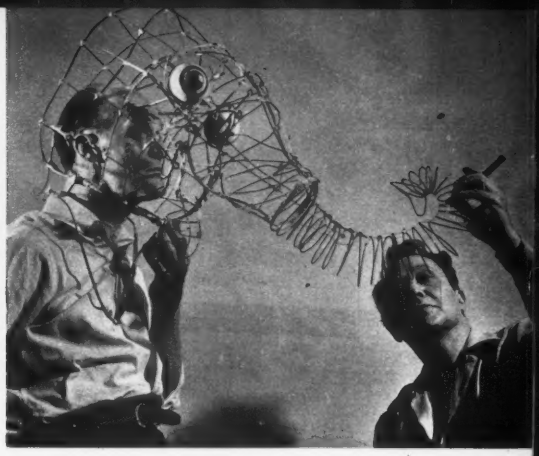
EVER see a hippopotamus trip the light fantastic? Well, the chances are that if you did, Leo Chenko was responsible.

No, Chenko doesn't feed alcohol to unsuspecting animals—he simply makes the creatures out of plastic, wire, wood, metal, cloth, papier mache, rubber and plaster. For almost 30 years he's been designing and building theatrical novelties. Chenko's creatures, all made to order, cavort on stages throughout the world.

Chenko, now 55, once toured the United States and Europe with his own ballet troupe. Then he began designing novelties for the Russian Ballet. Soon, some of the biggest names in show business were calling upon him for help. For Ziegfeld he made turntable sets, butterfly dresses and hourglass costumes for the "most beautiful girls in the world." Earl Carroll asked Chenko to make human-like elephants that could skate and Billy Rose ordered 24 dancing horses for the Fort Worth Exposition.

From then on, his business grew steadily. The Hollywood studios and many broadway musicals began to depend upon him whenever they needed a custom-built animal or a novel gimmick. He's made mascots for colleges, floats for parades and even flying flour bags for a ballet. The circus also calls upon him regularly and two of his creations—a doe and a bunny—appear on television.

While Mrs. Chenko, left, works on a rabbit head, a Chenko deer reads the latest news about zoos.



Elephant head has counter pulleys which open jaw six inches when wearer opens his mouth slightly.

Watch this hippo swing his hips as Chenko teaches him to dance. He rolls eyes and opens jaw, too.

Mrs. Chenko buttons up the hippo's trousers while Mr. Chenko, believe it or not, buttons his lip.

Chenko holds a patent on the motor-driven swan which Sonja Henie uses for entrances and exits in her ice show. In fact, he makes all the trick gadgets for the show.

But he makes his weirdest animals for Salvador Dali, the surrealist painter. Once, Dali asked for a ten-foot turtle with room for a man inside to walk on his knees. Chenko built it. Another time, Dali wanted a wheelbarrow filled with wispy cat tails provided with a fan underneath to blow the tails all over the place. Chenko came up with that, too.

Then, the eccentric painter requested a bicycle with enormous spoked wheels. He wanted it draped with silk and monkey fur. Chenko's biggest problem there was keeping the stuff from clogging the spokes and overthrowing the rider who was under a handicap, anyway. He had to wear a rock on his head!

Chenko has done lots of research at New York's Bellevue Hospital in order to gain his intimate knowledge of anatomy. His work demands ability as a mechanical engineer, sculptor, painter and construction engineer. Most craftsmen can afford to specialize but not Chenko—he has to be a jack-of-all-trades in order to fulfill his varied assignments.

And the range of his work really varies. He has made a snowman 20 feet high for a circus and a skating dummy for a vaudeville artist. Incidentally, this dummy had to

This nightclub "Centaurette" controls the horse's movement by swaying her strictly humanlike pair of hips.

Here's a Chenko creature on Broadway. It's Ken Leslie of Howdy Mr. Ice of 1950 going through one of the show's comedy routines in his monkey suit.

As Abie the Ape grins and shows his charming wooden teeth, Chenko makes an adjustment in the costume.

have flexible knees, elbows and ankles and smoke had to pour out of its ears and mouth. The dummy was operated by controls built into its back—the act was a super twin-drunk act. Chenko accomplished it all, although it took him a full year. And he charged a whopping fee—but the actor had a lifetime associate, one who wouldn't eat or drink. Or demand more pay, either.

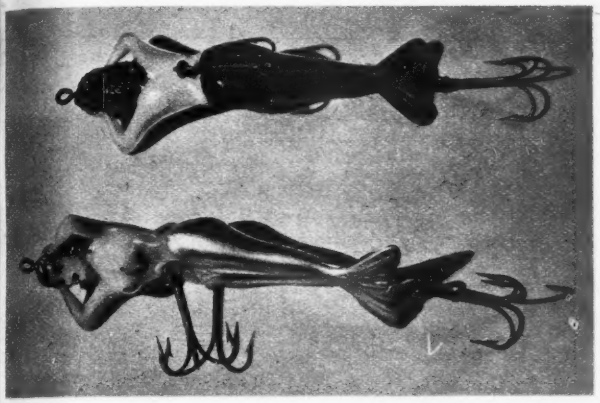
Often Chenko uses the real thing in his productions—it takes 200 rabbit skins to cover one of his giant rabbits. Once, while making a polar bear he found it necessary to scour the town for four polar-bear rugs to cover the framework of the beast. Sometimes, when many orders pile up, Chenko has to contact trappers to rush skins to meet his customer's demands.

Why has Chenko concentrated on animals? "Every person I see," he says, "reminds me of a counterpart in nature. Have you noticed how many animals act like humans—and vice versa?"

With his small corps of assistants, Chenko really feels he's following in the footsteps of Aesop and Fontaine, creators of literary fabled creatures. "And, remember," he points out, "we're one up on them. We build our own!" •

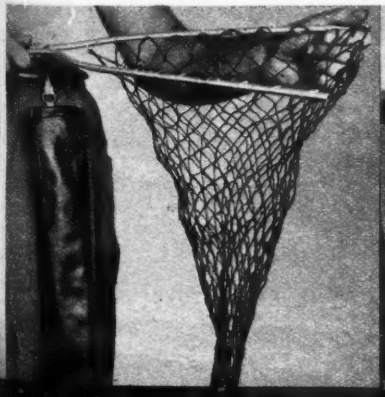
NEW for the SPORTSMAN

Golf Brush is hidden inside this golf ball which unscrews as shown. Bristles are hard nylon. Use it on cleats, clubs and balls. This Birdie-Brush is made by Birdie-Brush Mfg. Co., Nelson Ave., Toledo, O.



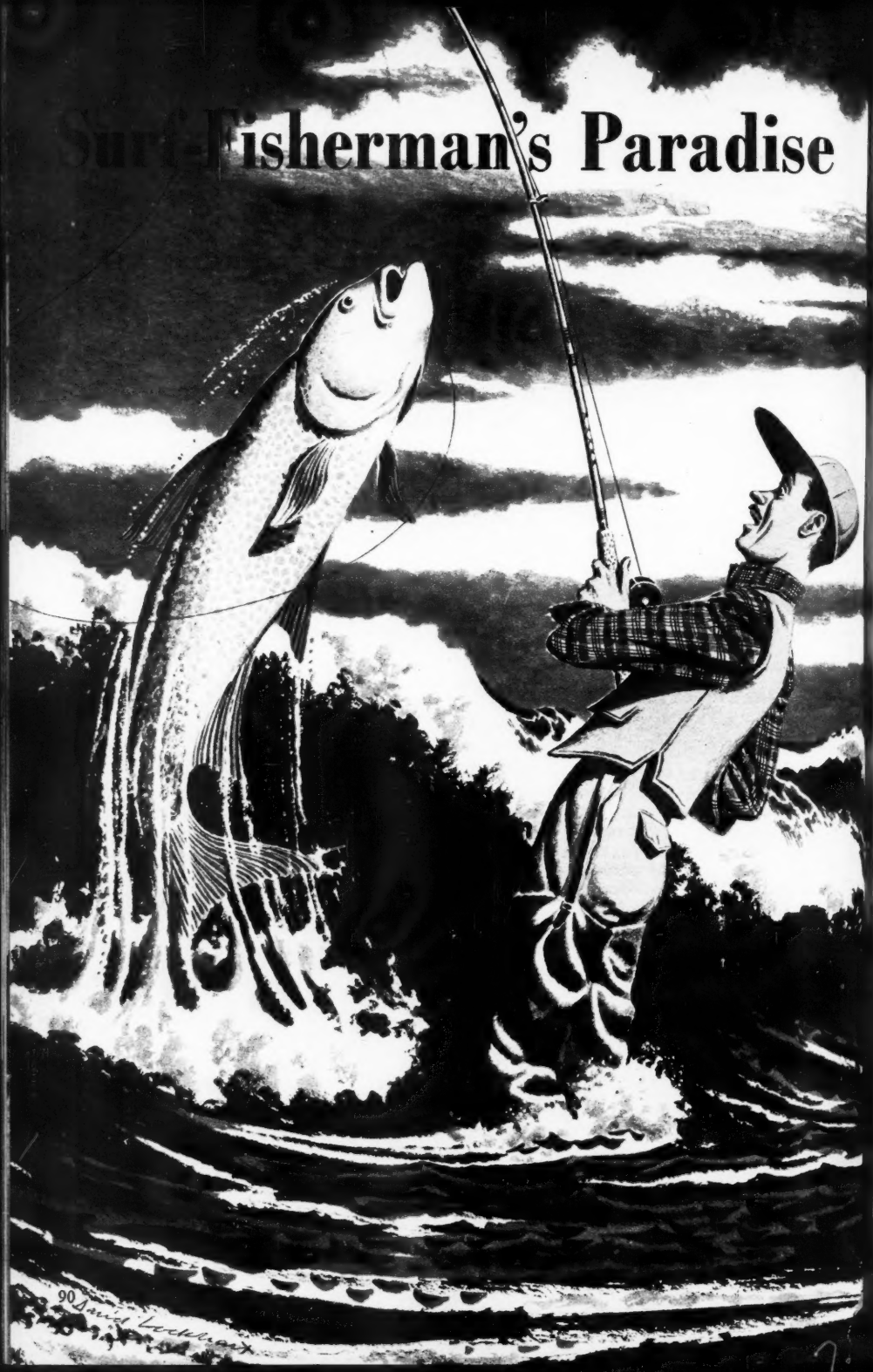
Mermaid lure is for the fisherman who likes a little art on the side. Makers claim record catches show fish are equally appreciative. It is made in red, gold and silver by Stream-Eze Inc., S. Main St., South Bend.

Deer Call is made of plastic with a rubber-band reed. Blow it and it bleats just like the real thing. In addition to bucks, it can call puma, mountain lion and bear. Made by Sport-Lore Inc., 970 Forest, Denver, Col.



Scabbard Net fits in a plastic holder suspended from your belt where it can't catch on twigs and bushes. Pull it out, squeeze the handle and it's ready for use. Very light. Made by P & K, Archer Ave., Chicago.

Surf-Fisherman's Paradise



Here's a real fish story! At La Pesca Pass you won't catch many fish . . . there are lots of them, but they're so darned strong you can't land them!

By George Scullin

YOU'RE standing in three feet of water, casting into a pass 90 feet deep. Suddenly, right in front of your face, a monster appears, spitting hooks. If it's your first crack at this kind of fishing, as it was mine, you don't waste a second. You drop your rod and head for shore, searching frantically for a tall, sea-growing tree as you go!

At least, that's the way it was with me. Pass fishing is a sport that flourishes from the Gulf coast of Texas on down into Mexico, and the farther south you go, the rougher it gets. At the end of the line is a place called La Pesca, a surf-fisherman's paradise where every kind of fish in the Gulf holds a year-round open season on fishermen.

La Pesca can hardly qualify as a resort. To reach it, you fly south from Brownsville, Tex., over sand, salt flats, shallow tide marshes and Laguna Madre, a great bay separated from the Gulf by a mile stretch of dunes.

Every 30 miles or so, the sea has sliced through the dunes to form a pass linking the bay with the Gulf. The passes vary in width from a couple of hundred yards to a half-mile. If you fly low, you can see the water streaked with fish waiting for the food that will be swept out to them by the changing tide.

Then, just before you reach La Pesca, the nature of the terrain changes. The bay becomes choked with islands and the trees teem with birds. The meandering inlets are full of oysters and often the water turns silver with the schools of mullet swarming over the oyster beds. If there ever was a paradise for game fish, this is it!

The only entrance and exit is La Pesca Pass, 160 miles south of Brownsville. All the water poured out by the rivers along the 60 miles of mainland must empty through this pass. It's only a couple of hundred yards wide and less than a quarter mile long. During change of tides, the water runs fast and deep. And such water! All the food of the tropical rivers, enriched by the spoils of the oyster beds, comes pouring into the gullets of the fightingest collection of game fish ever assembled in one place.

My host and pilot on this trip was Van Chamberlain of Falfurrias, Tex. He flew me down in his Luscombe Silvaire and two hours after we landed we were on our way to the pass.

Our guide suggested we troll on the way. Before my arm could recover from the shock of my first strike, I had lost a hundred yards of line and a plug. A mullet leaped out of the water and clipped Van above the eye, nearly knocking him overboard. And a fish-hawk swooped down and came up with a fish so big that the bird spun into the water with it.

A heavy surf was pounding on the outside of the pass when we finally landed on the sheltered inside. However, the fast, out-flowing tide cut the waves down to ordinary size and we were able to wade out to the edge of the pass without fear of being swept over the almost vertical bank. Where we stood waist deep, the water was green; ten feet farther out it was black and flecked with foam. A tarpon stuck its head out of the water, gaped and slowly sank back. I hooked my thumb in my haste to get a plug over the spot where he sank.

"Take it easy," urged Van. "There's a thousand more where he came from." But he made a bird's nest out of his line on his first cast and a fish snapped off his plug before he could get the line clear.

On my second cast, I tied into the end of the world and another hundred yards of line vanished into the Gulf. Van was down to his last few inches of line and was wading out up to his neck to save that. His neck wasn't long enough and we were out another spool of line.

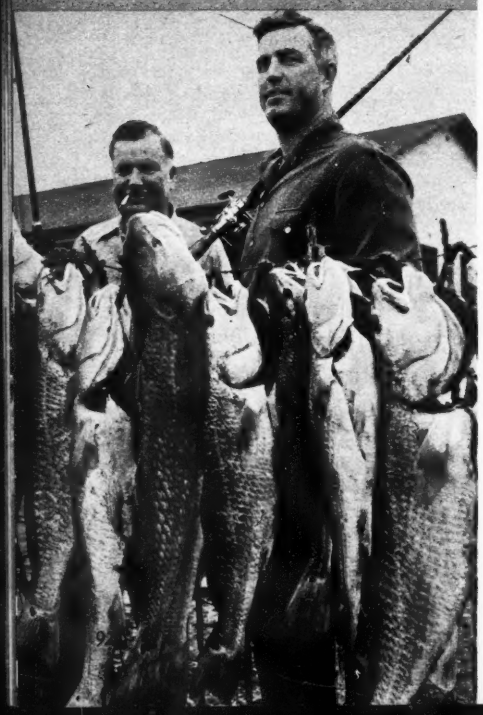
We switched to 35-pound test lines. The plugs we were using are called Batsell Killers. They looked like sawed-off clothes pins and carried two gang hooks. They had about as much action as a piece of driftwood but they had an appeal for fish that was little short of murder.

This time, when I tied into one, I could put the pressure on. So I did and wham! My knuckles were wrapped by a spinning reel. A wave went over the top of my head and then there was the sickening feeling of nothing more on my line. I was spitting out salt water and reeling in the dead line when a column of water blew up in my face. Inside was six feet of man-eating tarpon and he was looking for me!

It was at that point that I decided I was

Author George (Beachcomber) Scullin holds one of the few fish that didn't get away from him. What is it? A snook!

Below is a successful day's catch. Some of those red fish and channel bass weigh over 40 pounds. George didn't catch 'em.



out of my element and I took off for shore. If that fish was water-walking, he must have been ashamed of himself when he saw the act performed by a master.

By the time I recovered and began reeling in, that particular chunk of meanness had spit out the hook and was gone. Van was fighting something that leaped about like a berserk outboard. After 20 minutes of fighting, our guide gaffed it out of shallow water and it turned out to be a 12-pound snook, also known as robalo. Snook—what a terrible name to wish off on such a fighting fish!

Two more snook and a 20-pound channel bass finished the afternoon and just about finished us, too. Our guide took us back to Club Pesca where we managed to stay awake long enough to eat. Three more fishermen had flown in from Dallas and seemed a little let down when they learned we had landed only four fish in three hours. They had come down for some *real* fishing, they said.

Next afternoon the war began all over again. It started out with a snook. The Dallas boys looked stunned. Fish had no right to destroy expensive tackle so viciously!

We switched to surf casting rods and reels. They made casting the light plugs a little more difficult, but expert casting wasn't necessary.

My first tarpon strike came as something one might expect from a horse, not a fish. His first charge nearly stripped the reel. The line became a live connection, transmitting to me every surge of the great silver body. I regained some yardage and put more pressure on the pole. For 15 minutes I played him with everything I had and then he played me. He made one glorious leap, rolled over on the line in mid-air and then smashed back on the surface flat on his side, sending up a wide spray. My pole snapped, the line broke and I sat down!

I never knew what it was that broke my last rod, though. I caught something that just started for the bottom of the pass. It wasn't fighting, it was just going someplace.

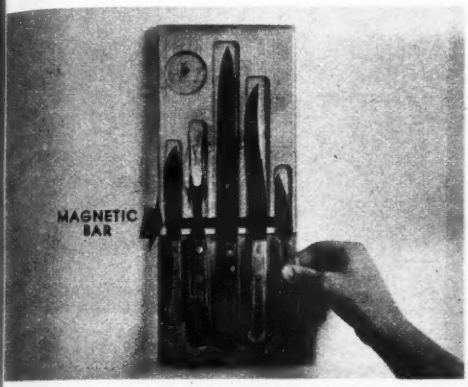
When the line was down to its last few feet, I threw everything I had into trying to stop the plunge. I hoped at least to salvage the empty reel. The pole snapped at the reel, but the line held. I grabbed the reel with both hands and pulled. Something gave and after reeling in I found it was the hooks. They had been pulled out straight and their points were bent as though they had been hooked into solid bone!

That ended our fishing. The fellows from Dallas were about as bad off as we were. They had lost most of their plugs, smashed most of their light tackle and were running out of line. They'd landed one tarpon and four snook.

Nobody made any more comments about coming down for some *real* fishing. They'd had it. And brother, so had I! •

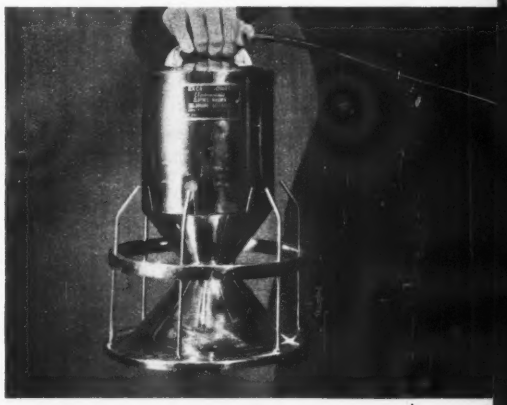
NEW for the HOME

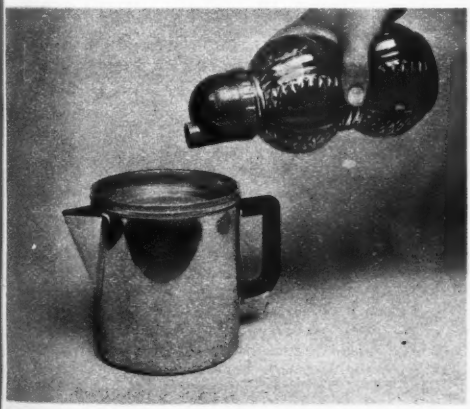
Tummy Seat is a versatile chair that can be reversed to permit you to sit on your stomach. You can use it "upside-down" as a conventional semi-reclining chair, too. Called Rever-sit, it's made of plywood and sheet aluminum covered with foam rubber padding. Invented and designed by Bartolucci-Waldheim, Chicago.



Look, No Hands! This knife holder keeps the pieces in place with a magnetic bar. It holds all the blades securely—even upside-down. Recessed grooves also protect your hands against cuts and your cutlery against scratches and nicks. The Robeson Cutlery Company, Perry, New York, distributes it.

Electrosonic Washer produces sound waves in the water. Then, the rapid vibration shakes loose the dirt on the clothing and holds it in suspension. The whole operation takes less than five minutes. This apparatus is about the size of a coffee pot. Excell & Jones of Melbourne, Australia are preparing it for export.



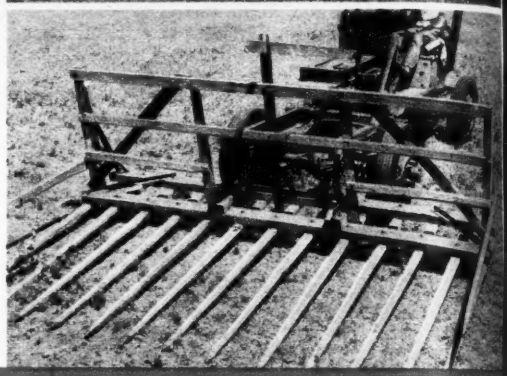


Measure Master dispenses just the correct amount of coffee for one cup each time the jar is lifted. A catch basin within the Tenite plastic top eliminates the spooning and spilling of grounds. Measuring Device Corporation of 890 Broadway, New York, New York.

Buzz-O-Larm protects you from burglars and fires. When your window is raised, a cord attached to the alarm box breaks, releasing a plunger and setting off the alarm. A fusible link is used for fire warnings. Carbert Co., Birmingham, Mich.

CRAFTS and HOBBIES

Workbench Award Winners...



HOMEMADE HAYSWEEP. **We're indebted to Janibell Smith for the information and the pictures shown here. The implement was inexpensively made from used materials by Mssrs. W. K. and W. A. Smith, Stuart, Neb. It replaces the usual pitchforks and wagon and will handle vast amounts of hay. Starting with a truck chassis, the builders reversed the controls and added a sweeper.**

THE winner—all of 'em! The six projects shown on these pages were the best Workbench Award entries received during the month. A five-dollar check and a Workbench Award Certificate are being mailed to each winner for his prize project.

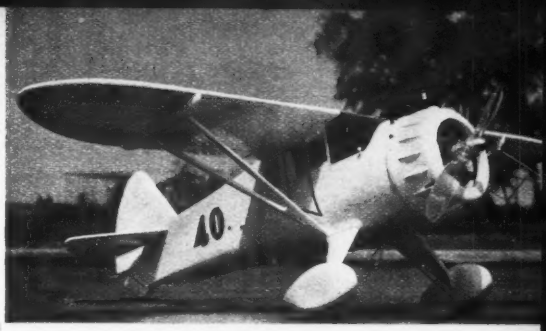
If you are a workshop fan, then why not let us know what you're doing? Send us a picture and a letter describing your project. If your entry is one of the monthly winners, you'll receive our check and Workbench Award Certificate, which, incidentally, is suitable for framing. If your entry is not one of the published winners, you still may win our handsome Certificate of Merit. Past winners of Workbench Awards may submit new entries, but the photos must be of a new project. Clear snapshots will do, but wherever possible glossy enlargements are preferred. We like to see your creations—but we also like to see you, so if at all possible submit a photograph of yourself with your project. Enclose sufficient stamps for return postage and mail your entry to:

MECHANIX ILLUSTRATED Workbench Awards, 67 West 44th Street, New York 18, New York.

VICTORY ONE-DESIGN SAILBOAT. **Designed for us by the famous naval architect, Wm. F. Crosby, this 18-ft. all-plywood racing boat (MI Feature Plan No. B-145) has proven to be speedy, responsive, and comfortable. Cledis H. Scott, Urbana, Ohio, built the one shown here. He writes, "My spare time for 10 months was occupied in turning out this project. Since I didn't have much 'spare time,' I consider that not too bad a record. I am well pleased with the boat. Despite the fact that it was my first attempt at boatbuilding, it handles very nicely. I'm looking forward to the time when I can tackle another of your boats."**

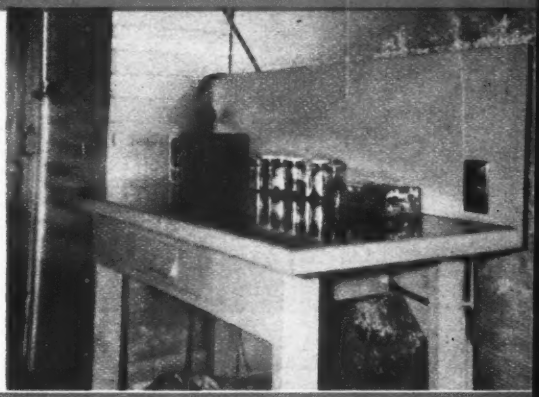
Congratulations, Mr. Smith, on your fine job. Since Victory is primarily intended to be raced in fleets, why not see if you can't persuade a few of your pals to build and register duplicate boats?

MR. MULLIGAN. This "hot" control-line model of the famous winner of both the Thompson and Bendix Trophies was made from MI Plan No. 374 by Abe Shuster, Montreal, Canada. His letter reads, "It took about two-and-one-half months to build. For a fine finish, I applied nine coats of dope—three of clear and six white. Power is an Ohlsson & Rice .60 Special with spark ignition. The model weighs 3 lbs., 8 ozs. Your full-size plans are swell."



REAL CAR FOR JUNIOR. Here's a snappy little roadster dreamed up in the shop of Alton D. Byrd, Sumter, S. C. He writes, "I made this for my little boy. It weighs 465 lbs. The engine, a two-hp. job from a Cushman Scooter, is located behind the seat and has a chain drive to the rear axle. It can do 35 m. p. h. and gets 60 miles per gallon of gas. I made the body of aluminum and the windshield of Plexiglas. The color scheme is gray and red. I've installed a low gear for hilly country."

UTILITY WORKBENCH. If you've just moved to a new home or if you never have had occasion until now to want a simple yet sturdy bench, this one'll prove ideal. Common hand tools, regular lumber, and MI Plan No. HJ-13 are all you need to duplicate the nice job shown at the right, which was made by Stewart Henry, Box 219, Dalhousie, New Brunswick, Canada. He comments in his letter, "Except for the fact that I added a small drawer, I built the job exactly in accordance with your plans. It's simple to construct and very sturdy. I like most that the work surface is clear."



OUTBOARD UTILITY BOAT. Charles D. Suitt, Silsbee, Texas, sent in these fine photos of his version of Snuffy (MI Plan No. 955). His letter reads, "This was my first try at boatbuilding. Thanks to your plans, I found her quite easy to construct and was very pleased with the results. The stem is white oak and the rest of the frame is straight-grained fir. The bottom and the sides, of course, are plywood. I stained and varnished the transom, front deck, and seats; painted the inside and underbody light gray; and finished the topsides in dark green. My Snuffy is named Honey Pot. She handles smoothly and will travel at a surprising rate with my 3.6-hp. outboard. I have had many compliments on her looks. The total cost of making her was $68.79."

As a coffee table the design is simple, yet distinctive. The length may be varied to fit your particular room.

coffee-dining table

IF you think the latest in scientific developments are confined to the field of medicine, mechanics and the like—think again. The furniture field is receiving its share of attention to make living more efficient. Although lacking a historical background—the prize selling point of period furniture—the comfort, utility and smart appearance of good modern pieces are responsible for their ever increasing popularity. This coffee-dining table typifies the theme of modern furniture design. Extremely simple, it is very distinctive and offers the maximum in utility. In less than ten seconds you can unfold the coffee table into a spacious dining table which can comfortably accommodate twelve people. Needless to say, apartment dwellers should welcome the project, especially since it can be built at a fraction of the cost of a single-purpose coffee table.

Another outstanding feature is that the top is covered with Micarta. This is a special stain-proof and heat-resistant surface that is as hard as marble and requires little care, if any. Produced by Westinghouse and distributed by the U. S. Plywood Corporation. Micarta consists of eleven layers of a special resin pressed together under extreme pressure (1500-2000 pounds per square inch) and heat (up to 380° F.). The top layer is a special transparent plastic about .003 inch thick fused to a layer of actual wood veneer about 1/85 of an inch thick.

Thus, the surface takes the appearance of the type wood veneer used. The remaining nine layers consist of a special resin lamination. This complete sheet is then bonded to waterproof plywood, or it may be obtained without the plywood base.

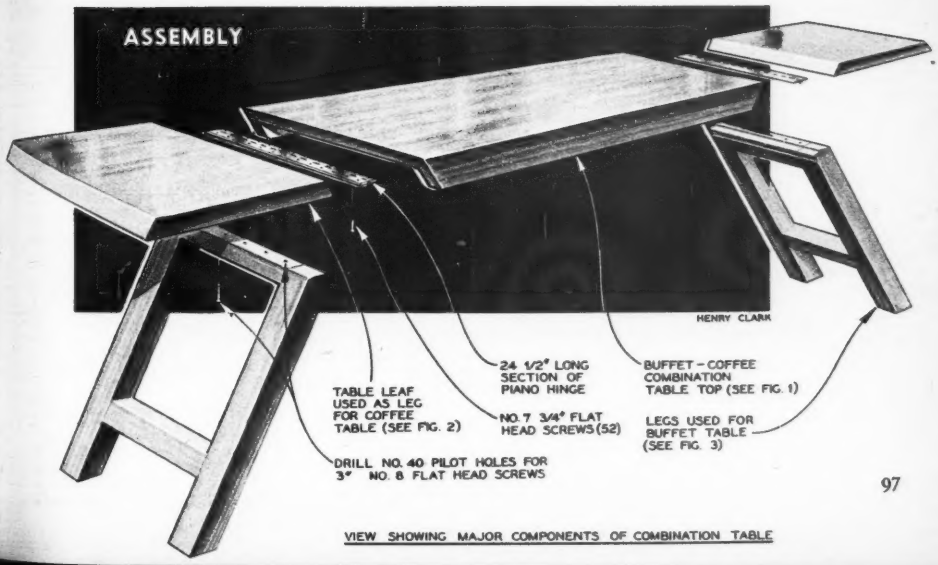
This type Micarta, called Tru-wood, comes in most of the popular wood finishes

By merely folding up the leaves your coffee table is now an eight-foot dining table. Top is covered with Micarta which looks just like wood but is stain and heat resistant and is not affected by alcohol or cigarette burns. Original table was built by Charles Mann of Charles' Woodcraft, Lynbrook, Long Island, N. Y.

istinctive.
lar room.

Utility and simplicity are the keynotes of this dual-purpose modern table that anyone can build.

By Larry Eisinger



VIEW SHOWING MAJOR COMPONENTS OF COMBINATION TABLE

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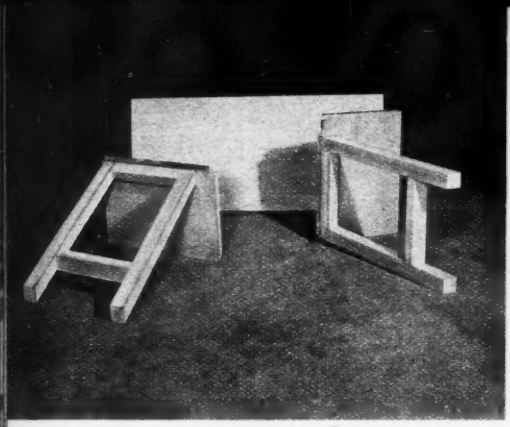
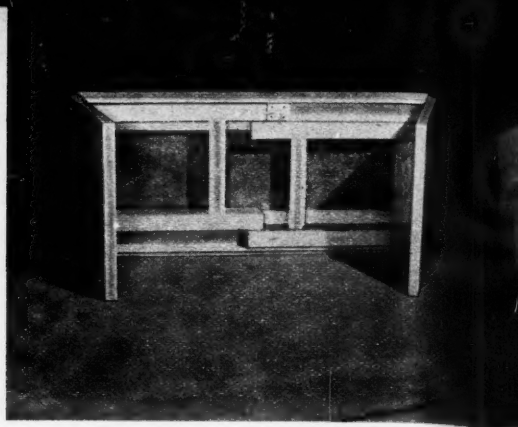


A 24-inch piano hinge holds the leaf and leg assembly to the top. Legs are primavera, but may be made from pine and veneered to match the top.



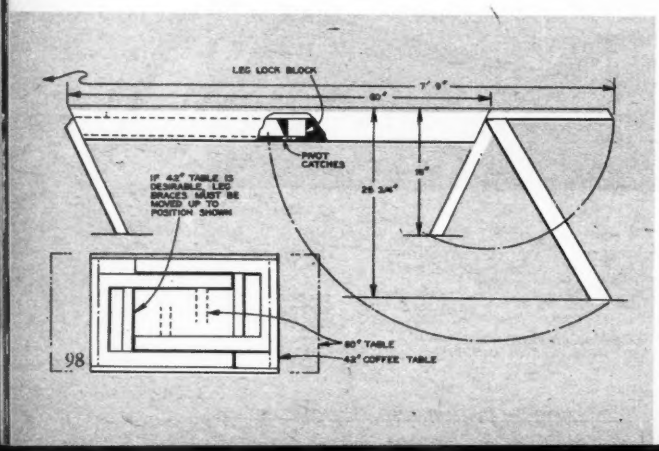
An underside view showing how the legs are staggered. If table length is 42 inches the bottom brace must be moved up as shown in the drawing below.

(mahogany, oak, walnut, etc.) in two grades, Standard and Cigarette-Proof. The latter differs from the Standard grade in that the layer directly beneath the wood veneer is aluminum foil which distributes the heat should a cigarette be dropped on the surface. But regardless of the grade, you'll find this wonderful finish will usually outwear your furniture. If you would like a free sample of the Micarta plus additional information send a penny postcard to U. S. Plywood Corporation, Micarta Division, Dept. MI, 55 West 44th Street, New York 18, New York.

The original table was made in the Korina finish, which is a blonde African wood similar to light mahogany. The legs were built up from 1 in. thick primavera (white mahogany) and all remaining plywood panels were ordinary Korina plywood.

After you have decided which size table (60 or 42 in.) will best suit your room, start construction with the top. This is cut from ⅞ in. Korina Micarta with a 25 degree angle on the narrow ends and a 45 degree angle on the lengthwise edges. A circular saw is used for this operation. When working with the Micarta, do not take the protective layer of paper from the decorative surface and make all cuts with a hollow ground blade. The bottom ¾ in. fir plywood "stiffeners" are then cut to size, screwed and glued to the bottom with 1¼ in. screws, countersunk. Note that the bottom side also has a layer of Micarta bonded to the ¾ in. plywood but minus the wood grain layer. Since this surface is very hard, spot all the screws and drill pilot holes (No. 40 drill) for each screw. The sides are now cut from ¾ in. thick Korina plywood and carefully glued to the top with Weldwood glue. After sides are complete, veneer narrow edges with either $\frac{1}{16}$ in. Korina veneer or unmounted Micarta. Clamp, set aside to dry.

The dining table leaves (or the coffee table legs) consist of a sheet of Micarta faced plywood glued and clamped to a sheet of Korina plywood or ¾ in. lumber core. The outside surface is Micarta with the inside the plywood. Glue both together and after the glue is thoroughly set, cut the angles as [*Continued on page* 136]



ENLARGED PLANS

for this project with all angles shown full size are available by sending one dollar to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich Connecticut. Please specify Plan No. HJ-16.

MATERIALS

If your local lumber yard cannot supply you with the necessary Micarta and wood, all material, cut to the exact size, may be obtained from The American Blueprint Company, 304 Madison Avenue, New York 18, New York.

Unloosen the pivot catches and the legs will swing open. When folded to dining table height, the weight of the table prevents legs from folding in.

After one side is unfolded you merely lift up the opposite end and the legs will come automatically down. Folding or unfolding takes about 10 seconds.

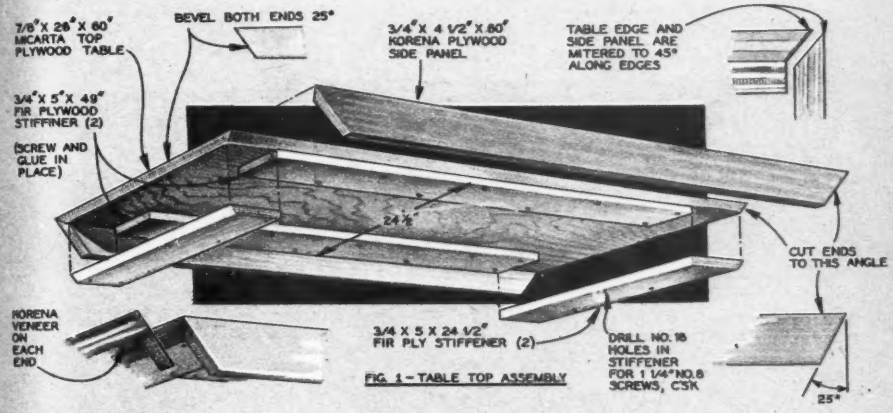


FIG. 1 – TABLE TOP ASSEMBLY

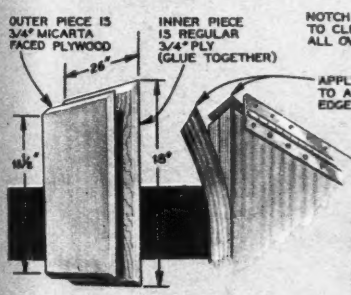
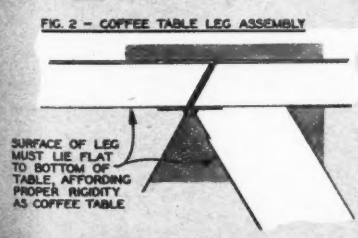


FIG. 2 – COFFEE TABLE LEG ASSEMBLY



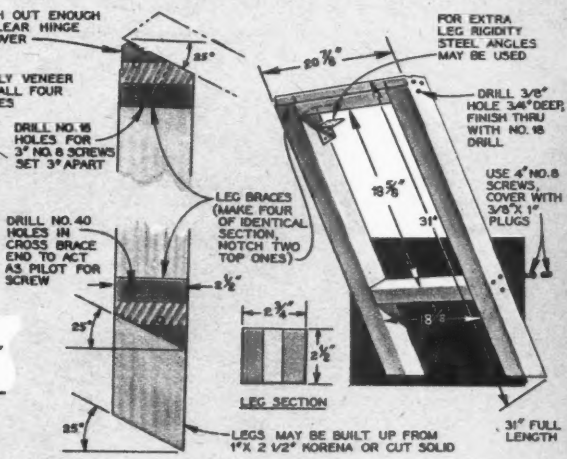


FIG. 3 – BUFFET TABLE LEG ASSEMBLY

"RC" SPECIAL

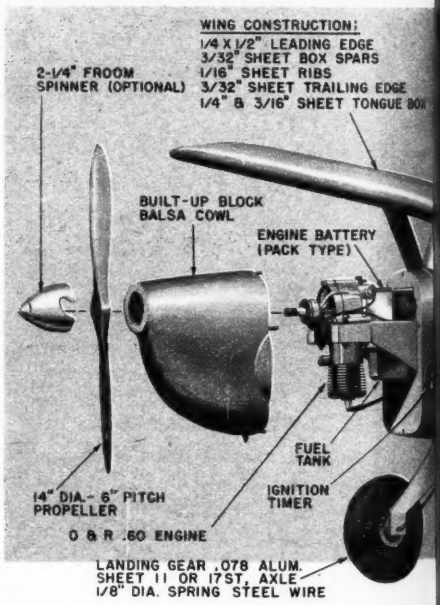
Tired of ordinary gas models? Then make this outstanding six-foot radio-controlled model your next project.

PART 1

By William Winter and Walter Schroeder

RADIO control, supreme thrill of model flying, is feasible for anyone who can build and successfully fly a gas-powered ship. You need know nothing about radio —we didn't—for a number of ready-to-go "RC" outfits are being manufactured, complete with easily understood directions.

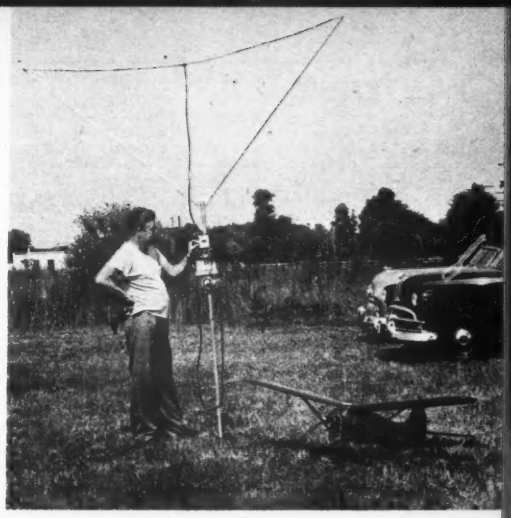
The Gederal Communications Commission does require a licensed amateur to operate the controls of the transmitter but the FCC is considering special arrangements for the model control field. One possibility is to permit the modeler to operate the controls with a "ham" present, to guarantee that the transmitter stays on the 50-54 megacycle band. Another is the provision of a special band—as Great Britain already has done for her model builders. Actually, in more than ten years of intensive radio-controlled flying, there has never been a case of interference; extreme low



power of our transmitters, plus the fact the such models are flown in rural areas, makes interference virtually impossible. Mr. T. J. Slowie, Secretary, Federal Communications Commission, Post Office Department Building, Twelfth Street and Pennsylvania Avenue N. W., Washington, D. C., is interested in hearing from hobbyists in radio control concerning this problem.

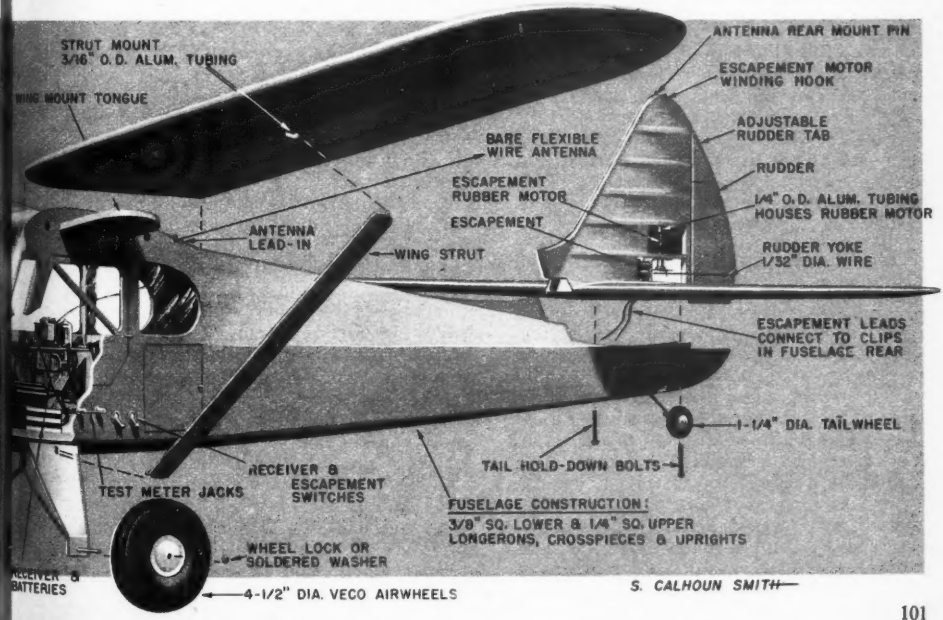
The broad specifications for this model were determined nearly three years ago. Two years of observation went by, while successful radio ships at the National Model Airplane Contests were studied, and long talks were had with such well known pioneers as the Good Brothers, Jim Walker, Gene Foxworthy, Harry Guyer, Ed Lorenze and many others. It was painfully obvious that successful "RC" jobs using commercially available equipment had to be inherently stable free-flying models, large, or at least, slow flying machines, that could be controlled without getting into real difficulties in the air. Notions of fast, peppy looking racers or fighters went out the window for, even with complex control involving extra channels, or with proportionate control in which surfaces respond in proportion to the movements of a stick, a "hot pilot" would feel hopeless trying to fly such a machine when located hundreds and perhaps thousands of feet from its cockpit.

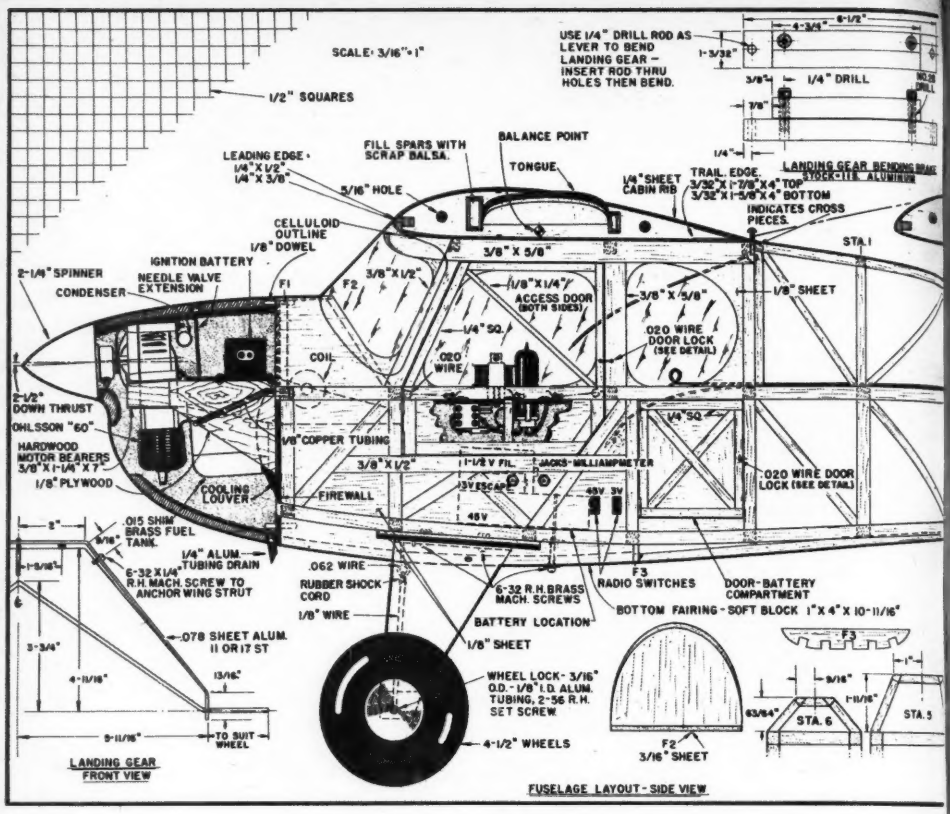
The decision to fly by rudder control alone was most fortunate. Not only does



The base of the collapsible "tower" containing the transmitter aerial is slipped into an iron pipe. Here's Author Bill Winter making a minor adjustment.

rudder permit an amazing variety of maneuvers, such as spins and loops, but the vital "thinking ahead" of the airplane is made relatively easy. For the real problem in "RC" is in your own think box. To analyze a maneuver while it is building up, remembering where the rudder was last, where you want it next, how to get it there, and how long to keep there, is a demanding job. At this writing, more than one channel remains a complicated affair, in the air





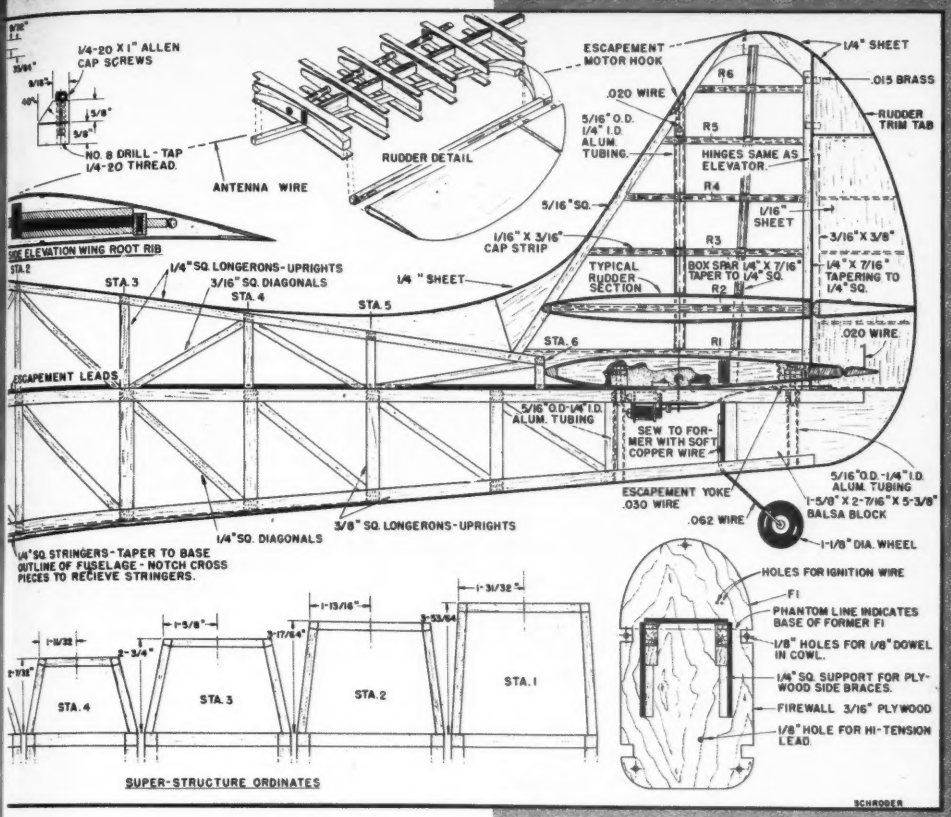
or on the ground, for the modeler who knows nothing of radio.

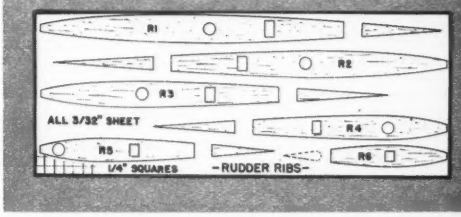
Good Brothers radio control, manufactured by Beacon Electronics Co., Pittsburgh, Pa., was selected, mainly for the reasons that the authors were most familiar with the Good Brothers equipment and their methods. Other fine systems exist, such as Aerotrol and RCH with which this airplane can be operated.

The Good's system includes a battery operated transmitter that measures 5x6x9 in. a 4½ ounce single-tube receiver (including the relay), measuring 4 in. in length; and an escapement mechanism, about the height of a match and weighing ¾ ounces. The escapement operates the rudder surface when it is triggered by the relay in the receiver. The transmitter consists of a single tube oscillator, actually two tubes in one bulb, the circuit being a self-osciliating push-pull transmitter. Actual control is by means of a button which, when pressed and released, actuates the relay in the receiver. The receiver is a one-tube superregenerative circuit. Relative sizes of this equipment—as well as the general workings of the system—may be seen on the plans and in the pictures.

Beacon Electronics provides a most thorough booklet on operation of their equipment, as well as flying "RC" models, at which the Goods are past masters, so specific details of the radio equipment will not be given here. It is suggested, however, that the builder discount battery life tables, replacing all flashlight batteries between flying sessions and checking receiver and transmitter batteries with a voltmeter or ammeter, as necessary. Both these instruments are fairly expensive but may be obtained in surplus supply houses located in any large city. Because batteries are expensive and short lived (a full set runs to ten bucks) do not operate the system needlessly and develop a quick, sure procedure for necessary checking of the system.

Considering the weight of the equipment and batteries to be carried by the airplane at a speed of about 25 m.p.h., a six square-foot wing area, six-foot span airplane was decided upon. The reliable Ohlsson and



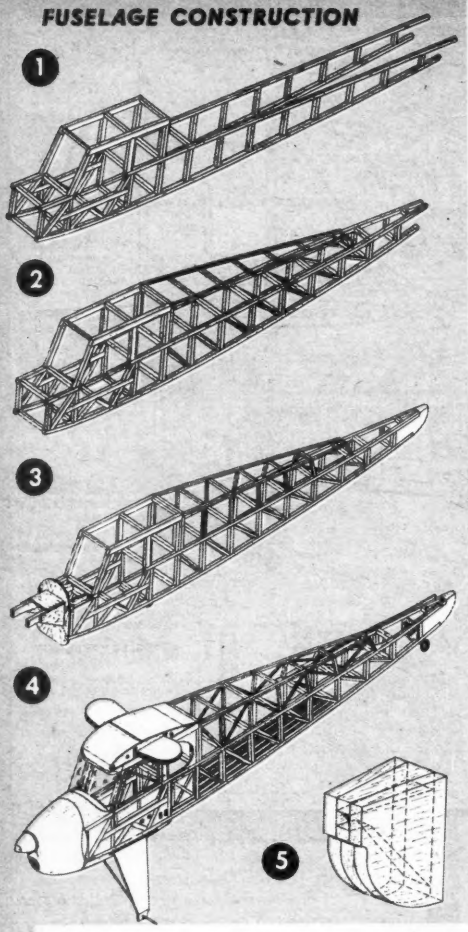


Rice "60" was selected for power. The powerplant must develop its peak power at relatively low r.p.m. and be capable of running when well throttled back. Excess climb spells trouble!

One construction feature that repeatedly saved the ship in crack-ups with trees was the knock-off wing panels, an idea borrowed from our English friends. The high loads involved required development of a system of knock-off struts that would support the dead weight of the wings in a full-stall landing and insure against failure in highly stressed maneuvers like tight loops. Because of our wing construction the model has survived crashes that would have splintered an ordinary job.

Although it is considered inadvisable to attempt control within fifty feet of the ground after launching, this ship is regularly controlled from the instant of launching until the wheels touch the ground. Once, when the launcher was struck on the back of the head with a stabilizer tip, throwing the ship into a right hand dive, it was possible to pull the model out of its turn with left rudder. When you realize that this required going from neutral to right, then back through neutral to left, the excellent control response and maneuvering ability is obvious. Approaches to a landing may be made in a full-rudder spiral, rolling the ship out with full opposite rudder just before touching down, relying on excess speed from the dive to trim the airplane slightly tail heavy for a realistic flared-out landing. This ship is virtually immune to sliding out of turns, or to spins, which have been the undoing of so many "RC" models. It has an exceptional control response which, coupled with full scale flight characteristics, permit snappy ma-

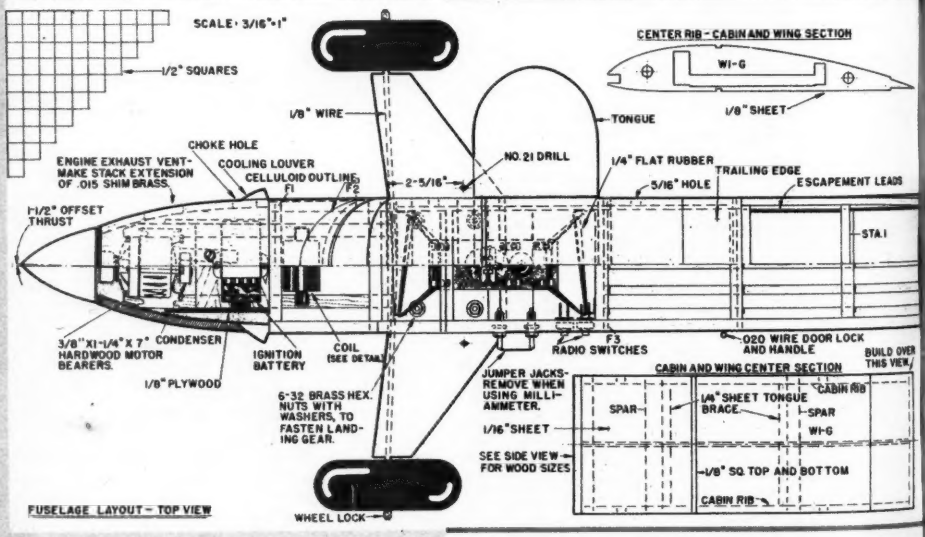
FUSELAGE CONSTRUCTION



neuvering anywhere and at anytime during flight without danger of crack-ups.

In this first of two installments, construction of the fuselage, landing gear, engine mounting, and installation of the radio will be discussed. Next month, wings, tail surfaces, assembly and flying will be covered. It is suggested that a careful study of the plans be made before beginning construction, not only to familiarize yourself with the many details and procedures, but to locate and list all special items, such as the Veco inflatable air wheels, which can be ordered through your model dealer. Then there is the matter of cement and dope, to be bought by the quart, of various sizes music wire, sheet brass, aluminum tubing, machine screws, plywood, to be picked up in hardware stores, supply houses, surplus stores, and so on. The balsa wood should be hand picked if possible. There are hard-to-get sizes, like that 3/8 in. square for longerons, but strong wood is essential in an airplane of this kind. Where specified materials are not available use your ingenuity in working out substitutes or alternate methods. Full size plans for this model may be purchased from the MI Reader Plans Service at the time the January MI (which contains the Part II installment) appears on the newsstands, December 21st. These plans will carefully list all material necessary.

The fuselage is a "box," with the cabin and center section of the wing built integral and a superstructure built on from the rear of the cabin to the front of the tail. Place a sheet of wax paper over your full-size drawings and pin down the two lon-



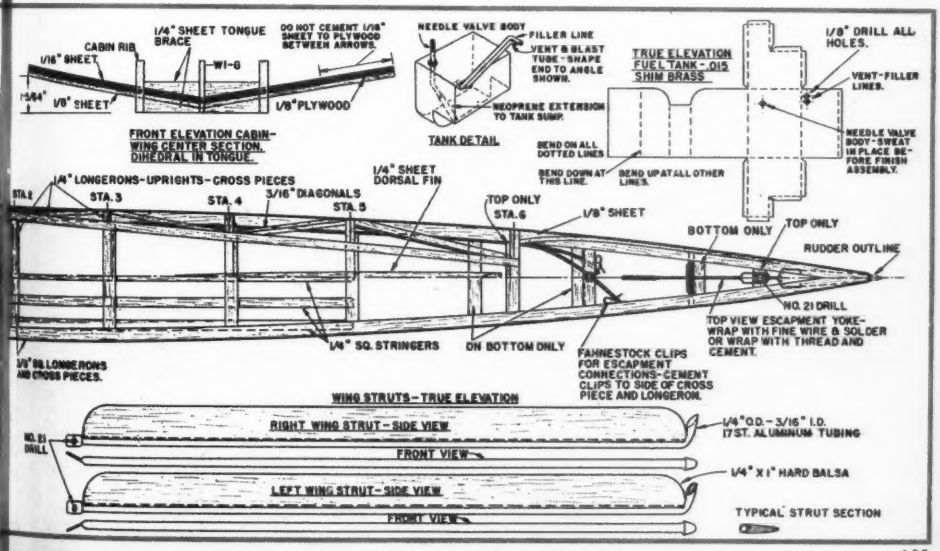
gerons for one side of the fuselage. Inasmuch as the wood is sturdy, it is advisable to soak it in boiling water for fifteen minutes, where the curve of the bottom longerons is visible, then let dry while holding the bend with straight pins or wire nails. This will accomplish the proper bend without imposing heavy strain on the framework—or your temper. Rub glue lightly over the raw ends of the cross pieces before finally glueing them in place. When this glue has dried, filling the end pores, put more glue on the ends of each cross piece and work it into position. Cut the ¼ in. square diagonals and glue them in place.

The cabin structure is built flat on the bench as part of the sides proper. Note the material sizes of ⅜x⅝ in. and ⅜x½ in., both of which can be cut from ⅜ in. thick wood. When the first side has dried overnight, lay out the second side directly on top. All pins and nails may be removed temporarily, if necessary, while the last two longerons are put down. Put small patches of wax paper between the two sides at all glued joints to prevent their sticking together. Allow the frame to dry overnight as before. When lifted from the bench, with wax paper removed, inspect the joints for softness and allow additional setting time if needed. Sometimes cement reacts with the wax paper to delay drying.

Long flat areas on the sides of the fuselage facilitate joining the halves together. Unlike smaller models, it is not advisable to pull the frames together at the rear after the widest cross pieces have been glued in position. Instead, having cut to size and glued in all cross pieces from the firewall back to the trailing edge station, wrap a strong rubber band around the projecting rear of the side frames, pulling them toward each other. Then begin at Station 2, back of the wing, cutting cross pieces and gluing them in place one by one. The extreme rear of the fuselage consists of a soft balsa block measuring $1\frac{9}{16}$x$2\frac{3}{16}$x5 in. (cut from 2x3 in). Note how the block is cut out to fit around the longerons. Before shaping drill out the $\frac{5}{16}$ in. hole shown, which will accommodate the aluminum tube guide for the stabilizer hold-down screws.

SUPERSTRUCTURE: This portion of the fuselage is built from ¼ in. square stringers at the corners, with the same size cross pieces and vertical supports, but with $\frac{3}{16}$ in. square diagonal braces. To begin, glue the two verticals, and one cross piece, of ¼ in. square, against the back of the cabin, then drop the ends of the long ¼ in. square corner stringers into the resulting notches and glue. Make temporary supports for the rear of the stringer pieces (Station 6) while the rearmost supports and cross pieces are tailor made for the angles and lengths called for. Remove the temporary pieces and glue in the supports and cross piece. Now follow up with all the other pieces, cutting the cross pieces to give the superstructure widths shown on the plans, and measuring the angle of the supports directly from the work by a proces of trial and error.

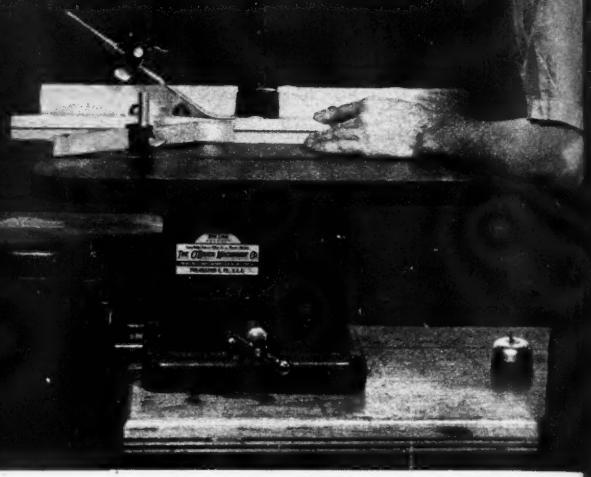
MOTOR BEARERS: Note particularly the amount of down thrust shown on the side view, since the model will not perform properly without it. Down thrust is achieved by [*Continued on page* 130]



how to use the SHAPER

Add a professional touch to your work with this compact and versatile power-operated tool.

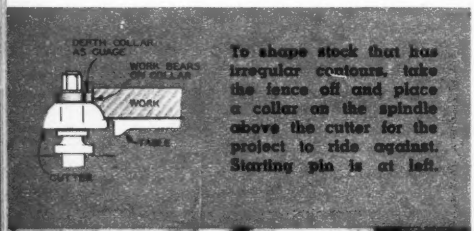
By John P. Arnold



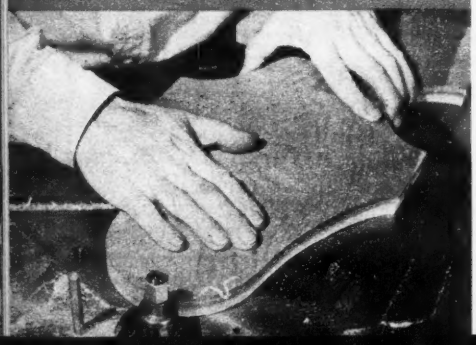
LET'S put it briefly: the shaper is probably the last power tool you'll buy to round out and complete your shop. As a universal finishing tool for piecework or production runs, it gives that professional touch which characterizes the finest examples of modern workmanship. A canvass of its possibilities should convince you that ultimately you should own one.

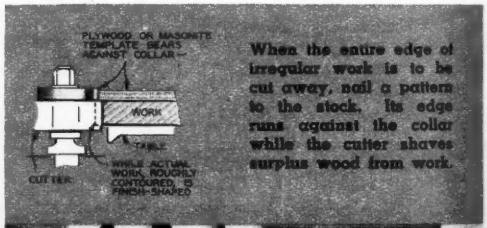
There are few professionally made wood products that haven't undergone a shaping operation in some stage of construction. Cabinetmakers, toy-and-novelty manufacturers, and general woodworkers employ single-spindle shapers, such as the one shown here, for making joints and adding whatever embellishments the work requires.

Hundreds of operations can be done on it. The sign of a competent operator is his ability to set up the machine for a particular job and to devise new methods when

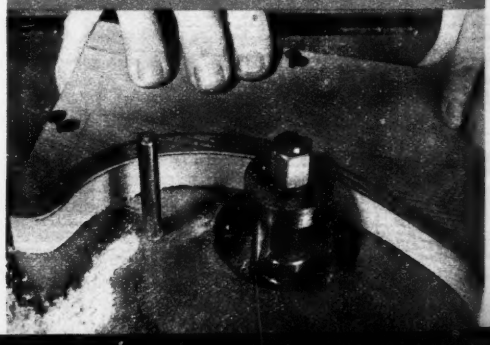


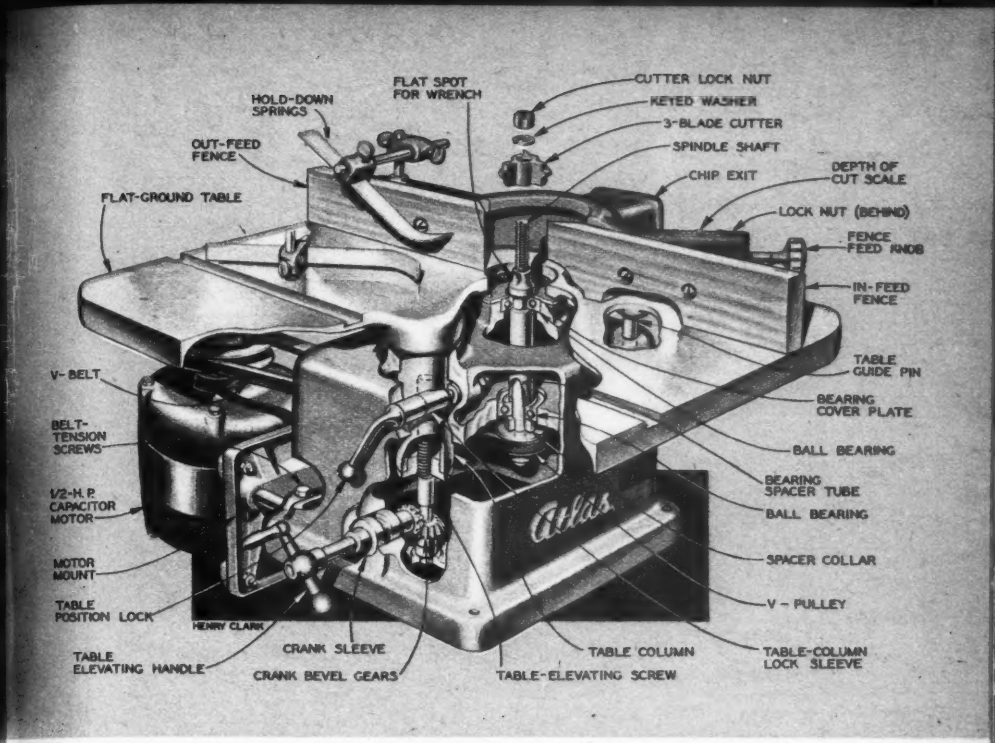
To shape stock that has irregular contours, take the fence off and place a collar on the spindle above the cutter for the project to ride against. Starting pin is at left.





When the entire edge of irregular work is to be cut away, nail a pattern to the stock. Its edge runs against the collar while the cutter shaves surplus wood from work.

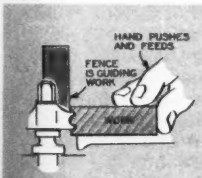




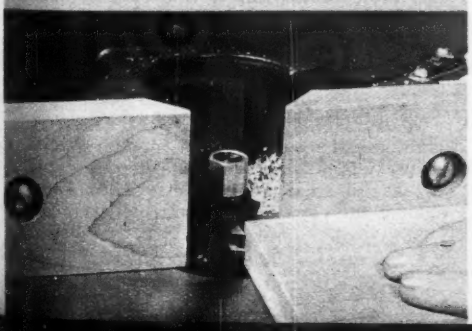
necessary. Such knowledge, naturally, must be picked up by the beginner as he goes along, but the basic principles and fundamentals of operation are readily acquired.

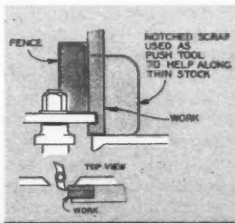
The bench shaper described here is suitable for either the amateur or the professional. Its ¾-in. alloy-steel spindle, rigidly supported by widely spaced ball bearings, is belt-driven by a ½-hp. motor at 8,270 r.p.m. The 15x21-in. table, which is grooved for a miter gauge and other fixtures, can be raised and lowered a full 2 inches. One section of the fence can be moved in and out ½ inch for operations in which entire edges of the work are to be cut away.

The spindle takes three-bladed cutters, which are capable of producing hundreds of varied moldings. These cutters are safe and require little experience to set up. They are easily sharpened merely by grinding across the flat faces of the blades. There are many other attachments that



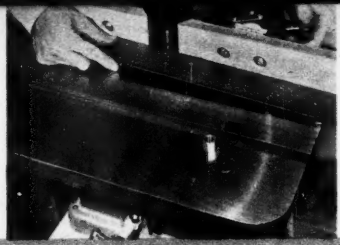
Cutting in a molding on the straightaway is the most common operation. The two sections of the fence, which is used as a guide, must be trued up in perfect alignment.



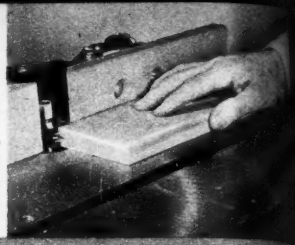


Making a box joint with the stock held on end. A notched scrap of wood is used as combination backing block and push stick to guide and move the work past the blade.

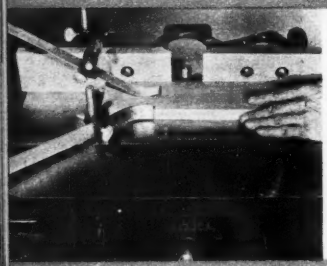
One of the advantages of the three-bladed cutters is that they are easily sharpened by grinding over the flat faces.



Using straightedge as a guide while setting the two halves of the fence in alignment so straight moldings can be run.

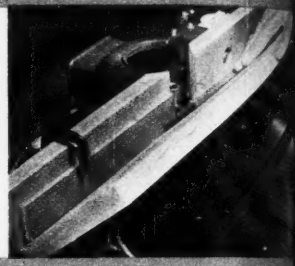


To position work vertically, a knob is turned, raising or lowering the table and stock in relation to fixed spindle.



Spring hold-downs are used to keep lengthy or bulky work in position under the rapid-fire impacts of the cutter blades.

End-grain shapes are cut with work held against miter gauge. Note the protective facing of wood that is added to gauge.



Miter cuts are made with the stock held at correct angle by an auxiliary table that's secured in place with clamps.

can be used for special operations, including sanding drums, saws, grinding wheels, router bits, special knives in safety cutterheads or clamp-type heads, fly cutters, planer heads, and rotary files.

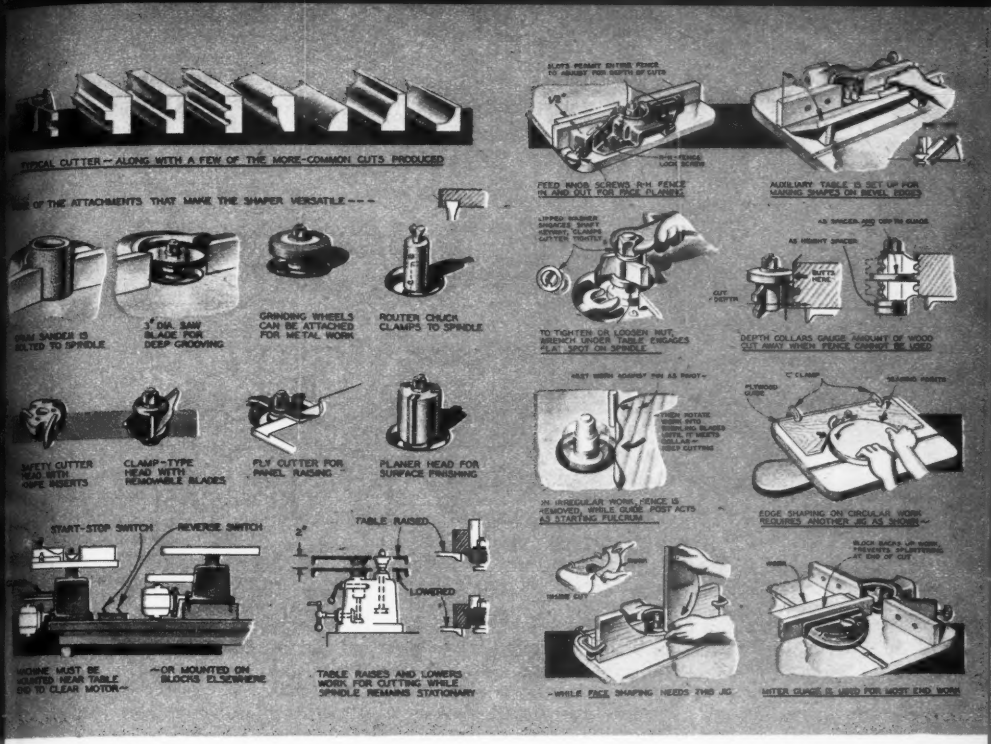
The most common setup requires both sections of the fence to be in perfect alignment. This is done by holding a straightedge against the left or outfeed section and moving the other section up to it. A cutter of the required shape is placed on the spindle with several collars to fill the unoccupied space, the table is raised or lowered so the cutters will strike the work at the right point, and the entire fence is moved in or out to expose the blade contour and limit the depth of cut; then the motor is started and the molding is run.

To take fullest advantage of three-bladed cutters, a reversing switch should be connected to the motor to change the direction of spindle rotation. The spindle normally turns counterclockwise (as viewed from the top), the work is fed from the right, and the cutter must be placed on the spindle so the flat faces of the blades enter the work first. With the direction of the rotation reversed, the cutter is inverted and the work is fed from the left side. Thus it is possible to make the cuts on the lower edges of the work, which is a safer way to operate and avoids unevenness due to possible variations in the thickness of the lumber.

When the entire edge of the work is to be cut away, the right fence is moved back the desired depth of cut and the left section is adjusted to support the work after it passes the cutter. When running long moldings, hold-downs keep the work flat against the fence and table. The miter gauge is useful for end-grain shaping. A wood facing should be fastened to it to avoid splintering the work at the end of the cut. Work stood on end for shaping can be guided with a notched backing block. Various special fences can be made for running moldings on either the inside or the outside of circular work or segments of circles. Matched cutters are used to run tongue-and-groove and drop-leaf joints.

When running mitered work, an auxiliary table, blocked up to whatever angle is required, is clamped to the machine. If the entire mitered edge is to be cut away, a strip of wood of suitable thickness is clamped to the outfeed fence to support the work.

With irregular or curved work, where it is impossible to use a fence, a collar of the correct diameter to limit the depth of cut is placed on the spindle. This collar rides against the edge of the work, which must



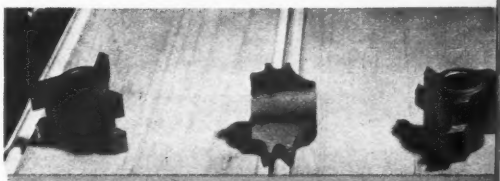
be quite smooth to avoid irregularities. Keep the stock moving to prevent the collar from scoring.

Collars must be ground true to diameter and should not be allowed to become incrusted with resinous deposits picked up from the wood. They can be cleaned with alcohol and covered with a light film of grease when stored away.

A starting pin, against which the irregular work can be held at the beginning of a cut, allows the operator to ease the wood into the cutter without any danger of its being thrown forcibly from his hands should the cutter grab. Because the cutter is not enclosed, cutting irregular work is the most hazardous of shaper operations. The beginner should take only light cuts on work large enough to keep the hands far away from the spindle until he becomes familiar with this method.

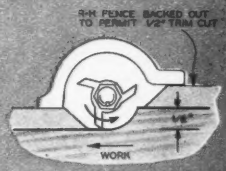
When the whole edge of irregular work is cut away, leaving no bearing surface for the collar, lightly brad a ¼-in. plywood pattern to the work. This pattern should be finished to the required outline shape. Its edge rides against the collar as the cut is made.

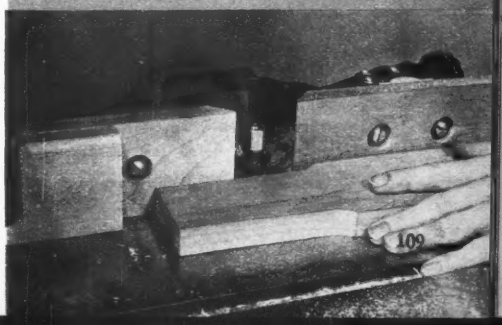
There's almost no end to the types of work that can be turned out on a shaper. Buy one and see for yourself! •

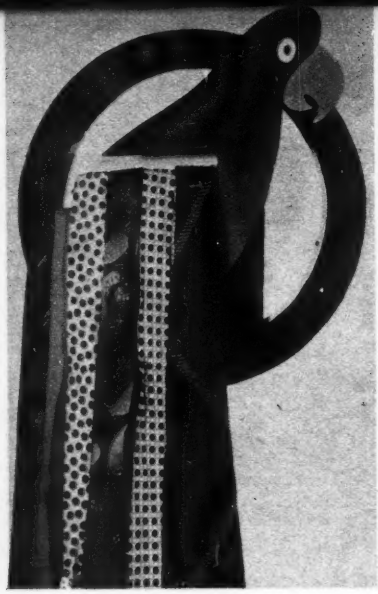


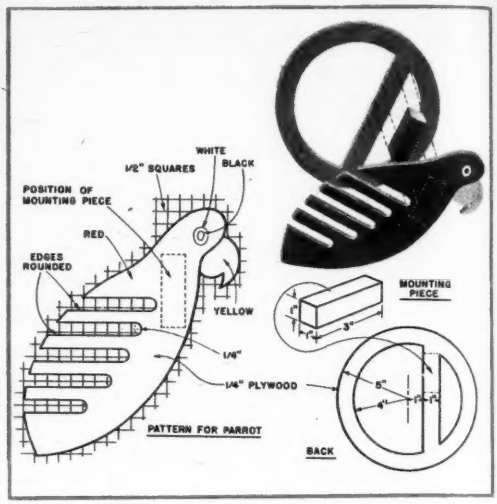
Sets of matched cutters can be obtained with which to shape tongue-and-groove joints and other special jobs such as drop-leaf joints.

If the entire edge of a straight piece is to be cut away, set the right part of the fence back the distance of the cut.



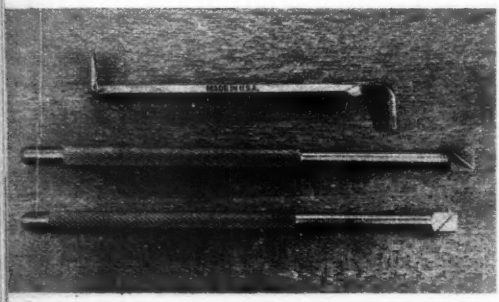




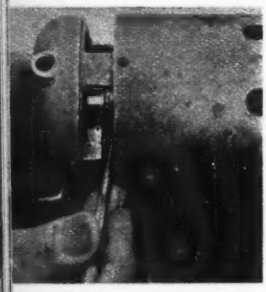


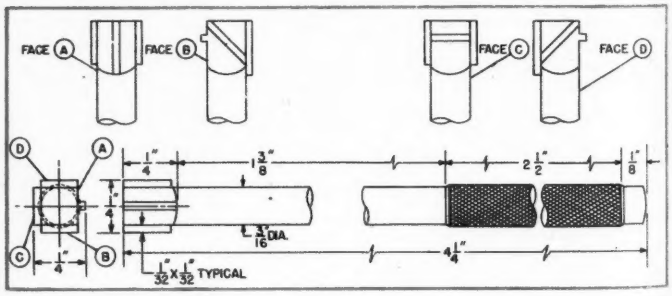
TIES resemble feathers on this parrot rack. But three simple pieces are needed—the body, the back, and the mounting block. Enlarge the body pattern to required size, transfer to stock, and saw to shape. Lay the design for the back directly out on the wood and cut out. Make the mounting block from scrap. Assemble the pieces with glue and brads. Seal with shellac and finish with bright-colored enamels.

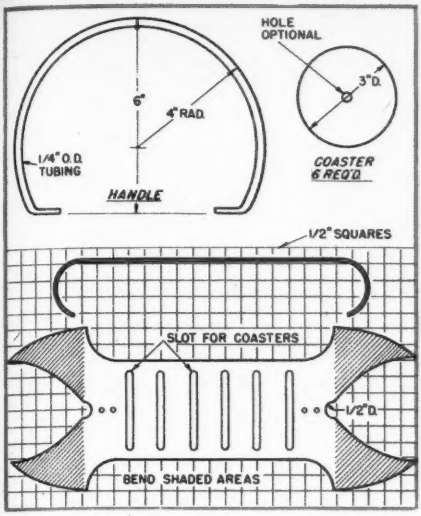
week-end projects



MAKERS of instruments or models often find it necessary to remove from finished pieces of work screws that can't be reached with a commercial offset screwdriver such as the one shown at the top of the accompanying photo. The drawing below shows a specially made screwdriver that'll reach most of these hard-to-get-at screws. It can be made either from one solid piece of ¼-in. stock (turning it to size and milling or filing the head to take screws) or from two pieces—a steel head and a shank from cold-rolled steel or brass.

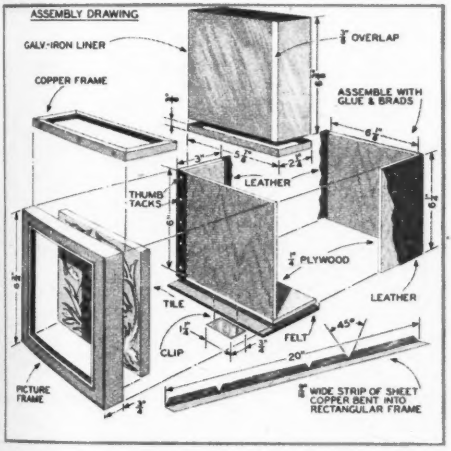




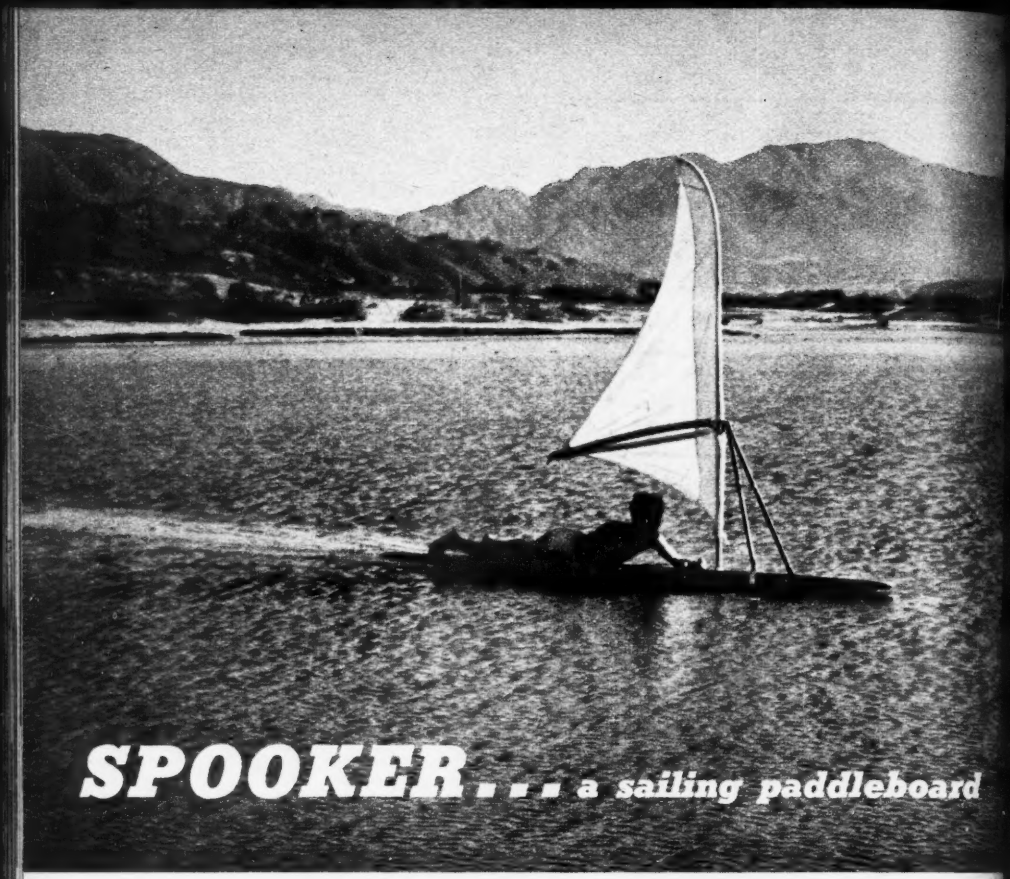


THIS coaster holder is a beginner's metalworking job. The body is made from a 5x13-in. sheet of .064-in. aluminum. Cut the outline with shears and drill the holes; then drill holes at the ends of the slots and cut between them with a coping saw with a metal-cutting blade. Hammer the ends to shape and secure the handle with ⅛-in. rivets. The coasters are sheet aluminum. Polish and finish with lacquer.

MI Guy says, "Put those leisure-time Saturday and Sunday hours to good use—make one of these items."



MODERN in design, these plant-holding bookends are made from glazed tiles, old picture frames, plywood scraps, and pieces of leather and sheet metal. All dimensions are based on using 6-in. tiles. Cut down the picture frames to fit snugly around the tiles. Make the boxes of plywood, line them with galvanized sheet steel, and cover them with leather. Add copper bindings around the tops. Secure tiles and frames to the copper bindings and, at the bottoms, to small rectangular clips.



SPOOKER . . . a sailing paddleboard

Length—15¼ feet. Beam—24 inches. Draft—19 inches.

Sail Area—30 sq. ft. Weight, complete—about 120 lb.

By C. W. Wilson and J. Kimber

AERODYNAMICALLY speaking, the rig shown here is *the* latest word. Economically speaking, it was designed to fit any conventional paddleboard and to cost less than $10. The board to which the rig was fitted (Fig. 11) cost less than $20 for materials. Thirty dollars! Did anyone ever get under sail for less?

The paddleboard is planked top and bottom with Masonite. Ripsaw the two panels to make four 2x8-ft. pieces. Place two pieces end to end on the floor and lay out the center line and ribs. Using a batten, draw in the deck edge; then saw out. The two bottom panels are templated and cut after the framework is assembled. (The 12-in. frame spacing is from the butt joint at the double rib to the near sides of the ribs in each direction.)

The bottoms of the two side pieces are tapered from Station 4 to the bow. Cut all ribs to length, taking the dimensions and bevels from the top panels; then rip Nos. 2 and 3 to match the depths of the side pieces. To make the stringers, rip one of the one-by-fours in half. In each rib, cut two stringer notches and suitable lightening holes. Bandsaw and plane the nose to shape and bore the three drain holes (the vertical hole is stoppered).

Assemble with waterproof glue and clamps. The after ends of the side pieces and the double rib at Frame 8 are bolted up. Elsewhere, flathead wood screws are used: 1½-in. No. 9's through the stringers into the bow and ribs, 2-in. No. 12's through the sides into the bow and ribs, and ¾-in. No. 6's on 3-in. centers

FIG. 1—MAST

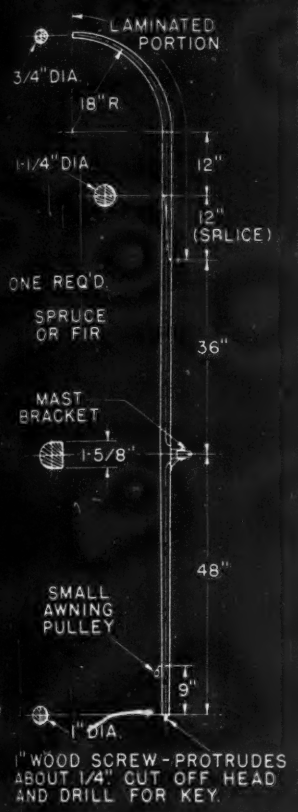


FIG. 2—STRUTS

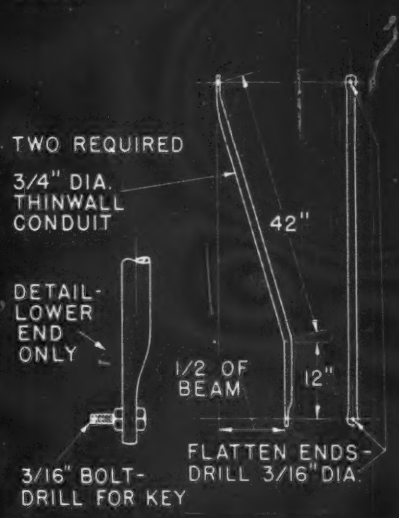


FIG. 3—BOOM

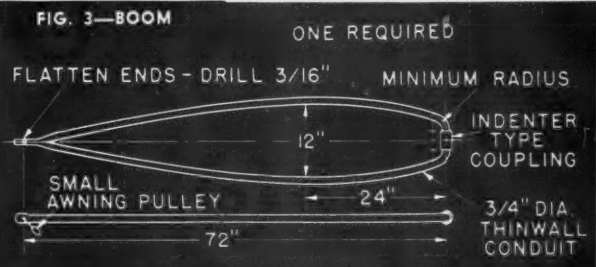
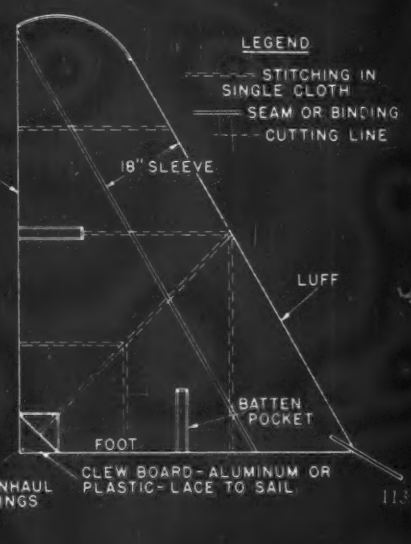


FIG. 4—SAIL LAYOUT

ONE REQUIRED
72" X 96" BEDSHEET

FIG. 5—FINISHED SAIL



FOLD CORNER OVER AND SEW TO MAIN PART OF CLOTH

The rigging folds down on deck so the board can be easily transported on top of your automobile.

through the Masonite into the framework.

Before securing the top and bottom panels, apply two coats of varnish to their undersides and lay glue-soaked cotton wicking on the side pieces. Finally, sand thoroughly and apply three coats of spar varnish.

Shape the straight portion of the mast to the dimensions given in Fig. 1. Build the curved portion by laminating and gluing strips around a form. Carefully fit the splice, glue the two portions together, and wrap the splice with heavy fishline. Apply three coats of varnish.

Lay out the struts (Fig. 2) and the boom (Fig. 3) full size on a piece of brown wrapping paper and take to your local electrician, who will supply the material and bend it.

The sail (Figs. 4 and 5) is made from a bedsheet. Get the distaff side of your household to do the job on her sewing machine. When laying it out, spread the sheet on the floor and lay the mast on top in its proper position. Be careful not to draw or stretch the cloth.

The rudder and control rod are detailed in Fig. 6. Since the leeboards (Fig. 7) are held in place by your body, round off the sharp edges on the deck piece. When making the mast bracket (Fig. 8) and the mast step and chain plates (Fig. 9), make sure the bracket fits snugly around the boom and the hinge works easily. The keys (Fig. 10) lock the mast, struts, and rudder in place. •

BILL OF MATERIALS

(Approximate Quantities Required)

Tempered Masonite

2 sheets, 1/8" x 4'-0" x 8'-0"

White Pine, White Cedar, or Longleaf Yellow Pine

(Specify that wood is to be used for boatbuilding, is to consist of A and B grades only, and is to be air dried to a maximum of 15% moisture content.)

Sail Battens: 1 pc., 1/4" x 1" x 24"
Mast: 5 pcs., 1/4" x 1 1/4" x 4'-6"; 1 pc., 2" x 2" x 8'-0"
Paddleboard: 5 pcs., 1" x 4" x 16'-0"
Leeboard: 1 pc., 1" x 9" x 24"
Paddleboard Nose: 1 pc., 2" x 6" x 15"

Sheet Metal

1 pc., 1/16" x 8" x 8"
1 pc., 3/32" x 24" x 30"

Fastenings

1 dozen 3/4" No. 6 roundhead wood screws
4 gross 3/4" No. 6 flathead wood screws
3 dozen 1 1/2" No. 9 flathead wood screws
5 dozen 2" No. 12 flathead wood screws
1 bolt, 3/16" x 3/4", with nut
1 bolt, 3/16" x 2", with nut and two washers
1 dozen bolts, 1/4" x 2", with nuts and washers
3 bolts, 3/8" x 1 1/2", with nuts and washers
8 rivets
3 cotter pins
4 screw eyes

Miscellaneous

1 pc. aluminum, 1/4" x 8 1/2" x 8 1/2"
1 pc. 1/8" dia. rod, 10'-0" long
3 pcs. 3/4" thin-wall conduit, 10'-0" long
1 indenter-type 3/4" coupling for above
2 swivel-type awning pulleys
1 bedsheet, 72" x 96"
24 ft. cotton clothesline
1 ball cotton wicking
1 gal. spar varnish
Waterproof glue to suit

LARGE-SCALE PLANS

will greatly simplify construction. Send $1 to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. B-166.

FIG. 6—RUDDER AND CONTROL ROD

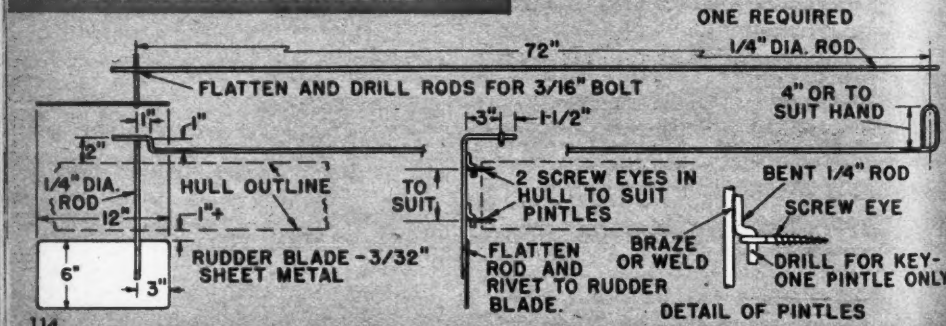


FIG. 7—LEEBOARDS

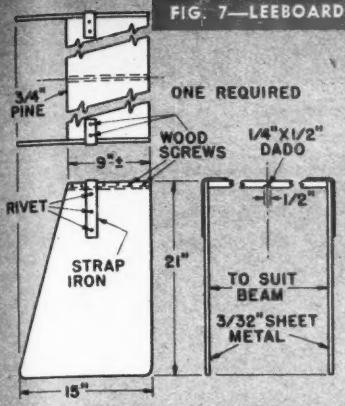


FIG. 9—MAST STEP AND CHAIN PLATES

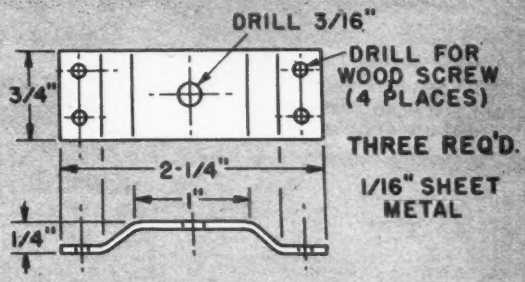


FIG. 8—MAST BRACKET

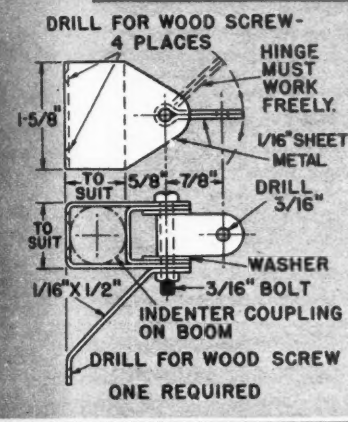


FIG. 11—ASSEMBLY BREAKDOWN

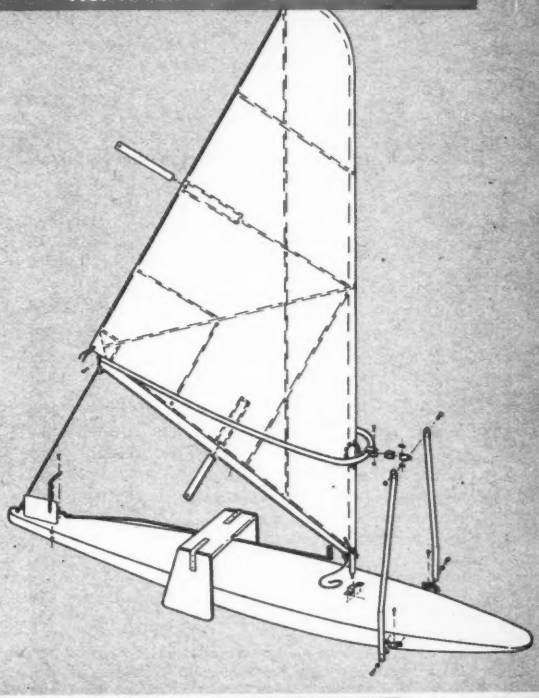


FIG. 10—KEY (FOUR REQ.)

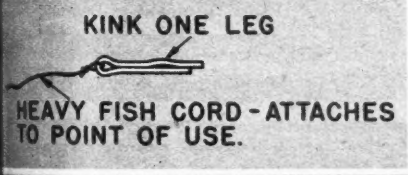
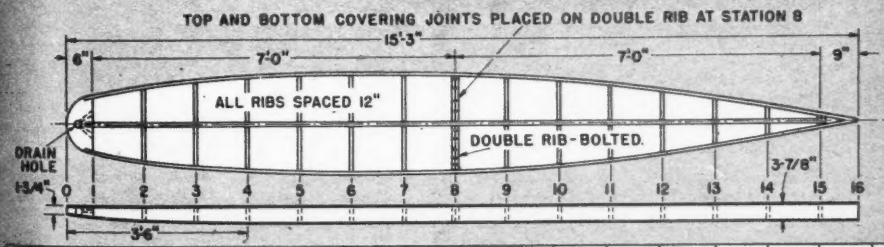


FIG. 12—PADDLEBOARD DETAILS



STATIONS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
WIDTHS	13-5/8	16-3/8	19-1/16	21-1/4	22-1/2	22-15/16	22-13/16	22-7/16	21-3/4	20-3/8	18-7/16	15-13/16	12-9/16	8-7/16	4-3/4	3/4
HALF WIDTHS	6-13/16	8-3/16	9-17/32	10-5/8	11-1/4	11-15/32	11-13/32	11-7/32	10-7/8	10-3/16	9-7/32	7-29/32	6-9/32	4-7/16	2-3/8	3/8

television tips

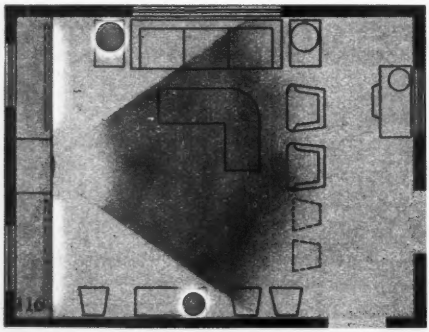
While these tips will not make a television expert out of you, they will help get better reception out of your set.

Dust and dirt will inevitably settle on the face of the picture tube and on the inside surface of the safety glass. You can remove the latter without disturbing the tube by undoing a couple of screws that hold the top of the cabinet in place. Use a window spray and polish the surface with soft rag.

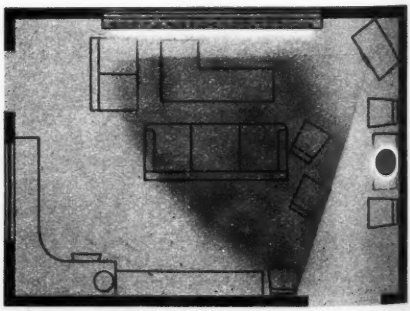
YOU don't have to be a television expert to keep your video receiver in tip-top working order. Here are some practical suggestions based on the experience of a busy New York TV service man, who says that at least half of his calls wouldn't be necessary if the customers would only apply a little common sense.

Many cases of jumpy reception with good receivers can be traced to "dirty" power lines. Any fixture or appliance with loose connections tends to act as a miniature radio transmitter when it is jarred and it sends out irregular impulses that raise havoc with the TV images. A defect in an ordinary radio set which manifests itself as a whistle, hum or growl, is usually masked by the sound. In a TV set, however, the eye sees the defect as some sort of a pattern on the screen.—*Robert Hertzberg*

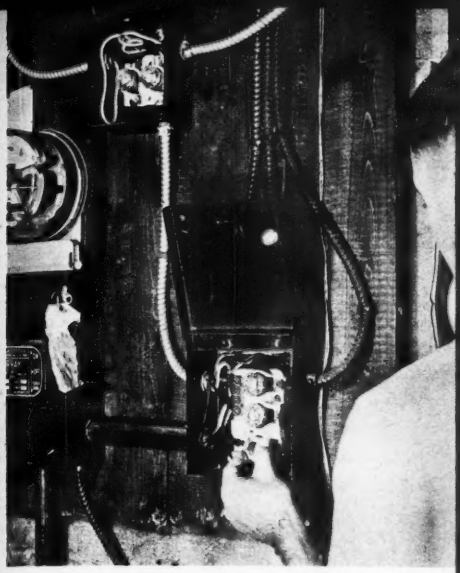
The set is between bookcase units which conceal fluorescent lights behind wood valances.



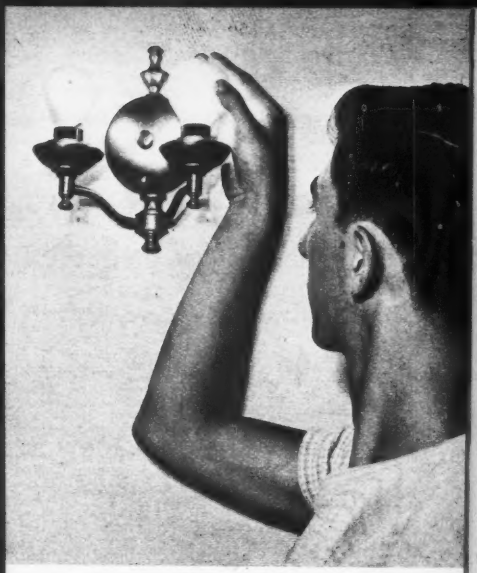
Another good arrangement. The table lamp at left of set is out of normal viewing range.



Drawings courtesy Sylvania Electric Co.

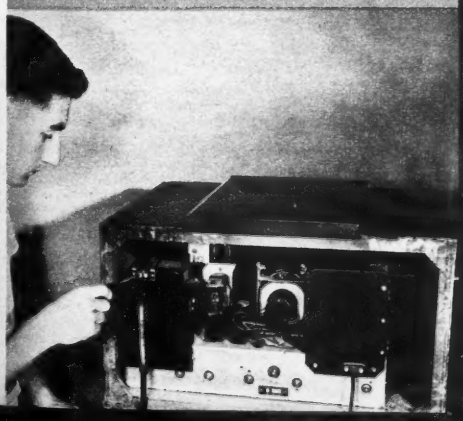


Start cleaning up the lines by examining the fuses near the meter. In most homes, fuses burn out so rarely that they are likely to be forgotten from one year to the next. Sandpaper the center connection tips of the fuses lightly with fine paper and screw them back firmly into place.

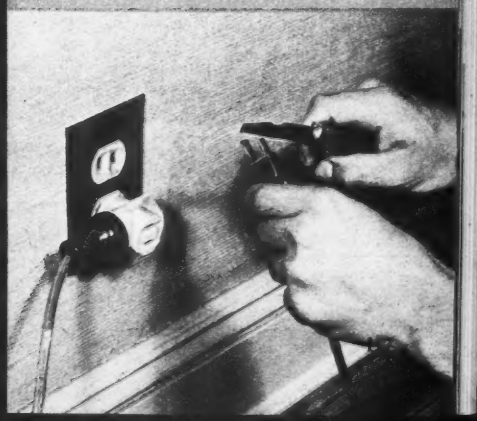


Loose lamps are a common source of trouble. Tightening them in their sockets with a half turn sometimes helps to eliminate zig-zag streaks across the face of nearby television receivers. Use some sandpaper on the base connections of the lamps if they are dirty or corroded.

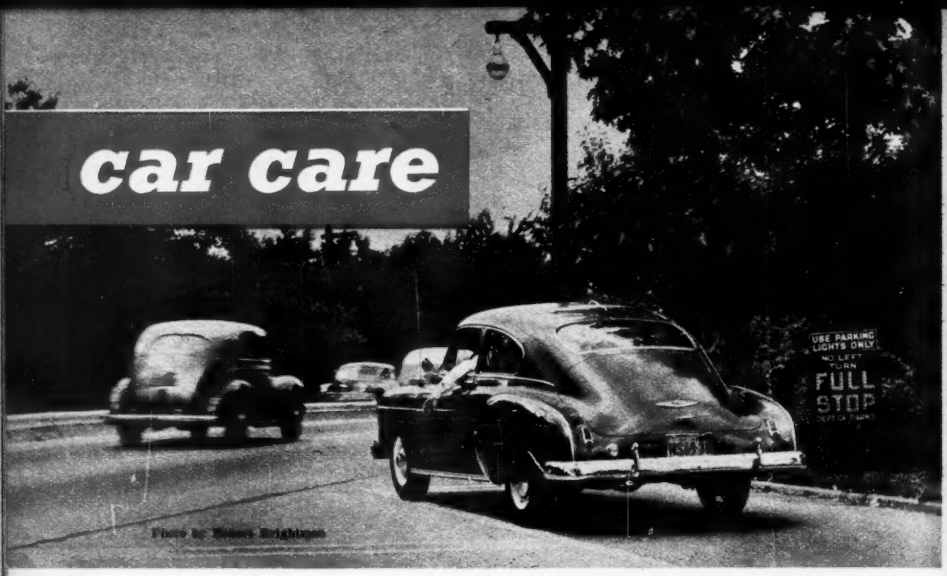
After the set has been pulled around from one position to another to satisfy different lookers, the aerial connections in the back are likely to be loose. Inspect them and tighten with a screwdriver. To take the strain off this rather vulnerable point, it is a good idea to anchor the lead-in strip to the bottom edge of the cabinet by means of a thumbtack.



Very few attachment plugs fit properly in wall outlets. First make sure the prongs are bright and clean (a light scraping with the back edge of a knife does wonders), and then spread them a bit to make them seat tightly in the receptacle. If a plug can be pulled out by means of its cord, a practice not recommended, it is too loose. Use plugs with spring prongs.



car care



Play fair. By failing to come to a complete stop you may cause the oncoming car to swerve violently to the left.

Two booklets which should be in the hands of every driver have come to our attention. *We Drivers* is available without cost from the General Motors Corporation in New York City and *Motor Manners* can be procured from your local Esso dealer. The safety suggestions contained in both books are a "must" if you expect to live to a ripe old age. **Greasy brakes** act differently when cold than when hot. When cold, a grease-laden brake will slip, throwing the braking power to the opposite wheel. When hot, such a brake will grab. **A buzzing sound** when operating the clutch means that the clutch release spring has become unfastened. If you hear a ringing noise it means that the clutch disk is loose or badly worn. **A speedometer needle** that waves back and forth in a highly nervous state is usually due to too long a cable. A kink in the cable will have the same effect. **Bald front tires** may aggravate skidding by increasing a car's tendency to wander. **Dragging brakes** can be due to many causes, but, first check for weak retractor springs. **Excessive oil consumption** in a new car was checked by one reader by plugging the down-draft crankcase breather. Another way to break the vacuum, caused by the car's forward motion, is by using a cap with a filter element in the oil filler pipe.

behind the wheel

With Frederick C. Russell

If you want a personal reply, please enclose a self-addressed, stamped envelope.

My 1935 Ford has a bad vibration period at 32 to 38 mph. It appears even when car is coasting in neutral. F. E. Manchester, Portland, Ore.

Check the propeller shaft, it may be whipping. Also, look for an unbalanced rear wheel.

From whom can I get a manual to cover a 1929 Dodge? Clarence Thiel, Tipton, Mo.

Try Theo. Audel Publishing Co., at 49 W. 23d St., New York 10, N. Y., or Motor, 572 Madison Ave., New York 22, N. Y.

Where can I get a tachometer for my 1934 Plymouth? How much will it cost? Marvin Garner, Independence, Kans.

Write to the AC Spark Plug Co., at Flint, Mich. It may cost you around $40.00.

Where can I get a crank shaft and timing gear for a 1928 Hupmobile? John Normann, Crookston, Minn.

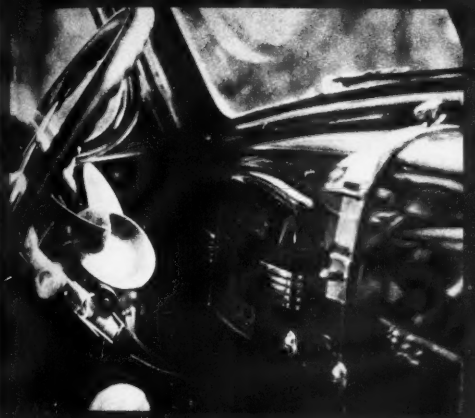
Try the Dallas E. Winslow Co., at Auburn, Ind.

My 1948 Chevrolet misses when I approach 60 mph. Will run OK when I install new plugs but the same trouble appears after 2,000 miles. Would you advise reboring for larger size plugs as supplied in 1949 Chevrolets? Also, how come the tail pipes on all Chevrolets rust and disintegrate in only a few months? Michael P. Perez, Jr., San Antonio, Tex.

Try using cooler plugs. This may help. The rapid demise of tail pipes indicates the use of light sheet metal.

Skid chains can be used to check a slipping wheel. Drape the chains over the top of the tire so that the wheel will carry its "track" to the road.

White sidewall tire can be cleaned with fine steel wool and glass wax. Steel wool is not as harsh on rubber as it is on an unyielding metal surface.



Defrosting is more effective if the fan blows directly into the windshield. Keep the swivel windows closed and have heater all the way "on."

Radiator temperature is one way to tell if the thermostat is on the job. Warm radiator top is indication that thermostat has opened too soon.

If you have a leak around the water hose, tighten the clamps. Don't tighten too much or else you may aggravate the leak. Shellac inside of new hose.

Air-cushion tires should have a higher pressure during the winter, as there's less build-up due to cooler road surfaces. Add two more pounds.

Senior and Junior "Hotshots." Radio antenna on model is an arm leading to the toggle switch. When you want to stop the model merely touch the switch arm.

Electric CROSLEY HOTSHOT

A 9-inch electric motor driven replica of Crosley's latest car. Built one in a day.

By Douglas Rolfe

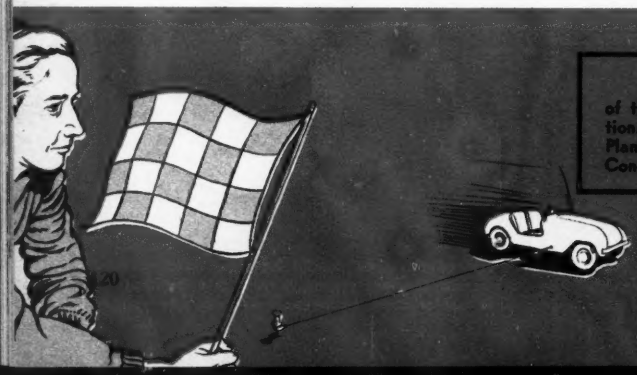
HERE S a new twist in battery powered model automobiles—an exact-scale Crosley Hotshot that speeds around in a circle on a piece of string! In this manner, your living room floor can be instantly (and safely) converted into a "race track" by merely attaching one end of the string to the head of a ½ in. push-pin as shown in the sketch below and hooking the other end to your Hotshot.

Powered with two medium flashlight batteries which are connected in series to a miniature electric motor, the car has plenty of pep. And if it's added speed you're after, hook up four penlite cells in series to produce six volts and your model will live up to the reputation—and the name—established by the full size man-carrying car.

Construction cost is about three and a half dollars, which includes the miniature electric motor. All supplies can be purchased from your local hobby shop.

The body shell is made from two pieces of balsa joined as shown in the detail of the preliminary assembly. When the shell is assembled the balsa sides are finished and then painted. Like the body, the chassis is very simple. The dummy shaft housing is not essential to the design but adds to the appearance of the finished model.

After the motor is hooked up paint the body your favorite color, first applying a wood filler and then two or three coats of colored dope. •



FULL SIZE PLANS

of this model will greatly simplify construction. Send 35c to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. 409.

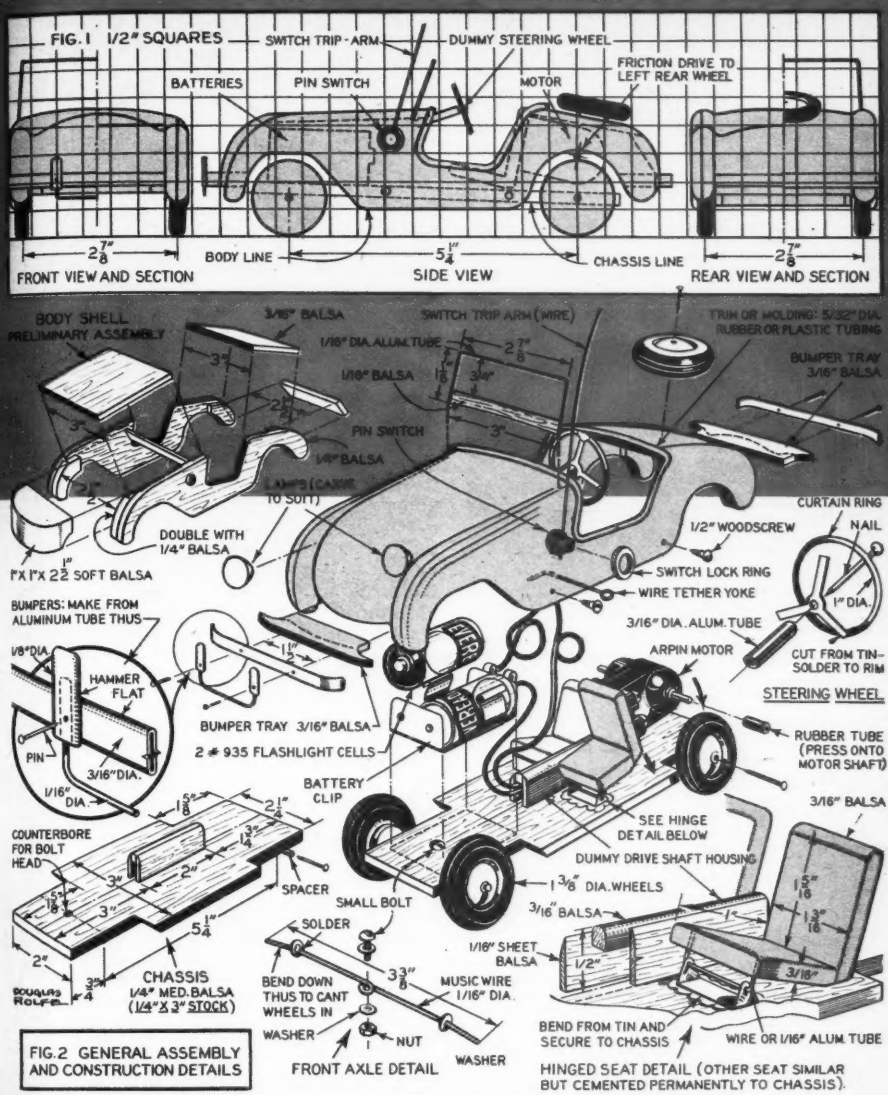
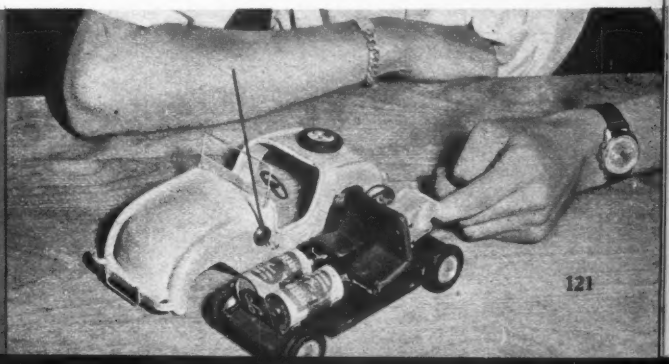
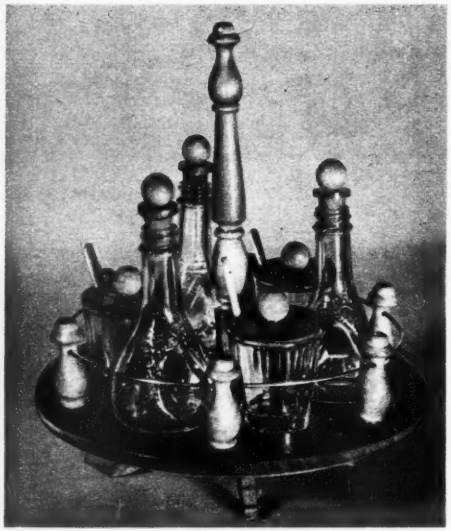


FIG. 2 GENERAL ASSEMBLY AND CONSTRUCTION DETAILS



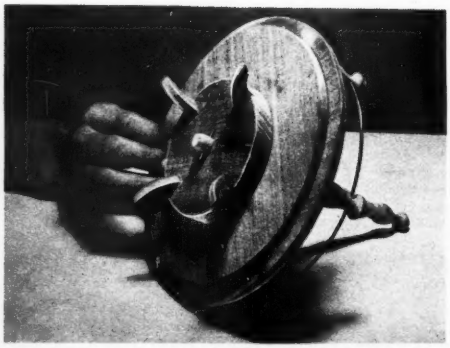
The body shell can be easily removed for battery replacement. Note how motor is mounted on back of the hinged seat. Model has friction drive to the rear wheel.



Above. Ready for use, the Lazy Susan is finished with two coats of shellac diluted with alcohol.

Below. Bottom, showing nail that holds assembly. Hole in base is oversize to let spindle revolve.

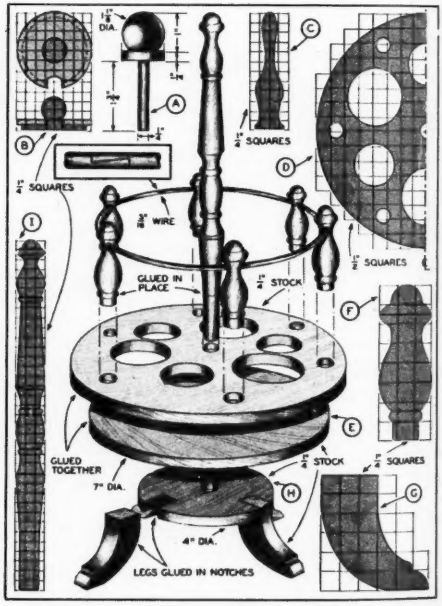
Bottom. Empty flavoring containers and big shot glasses have scrap-wood stoppers, lids, paddles.



Lazy Susan Holds Condiments

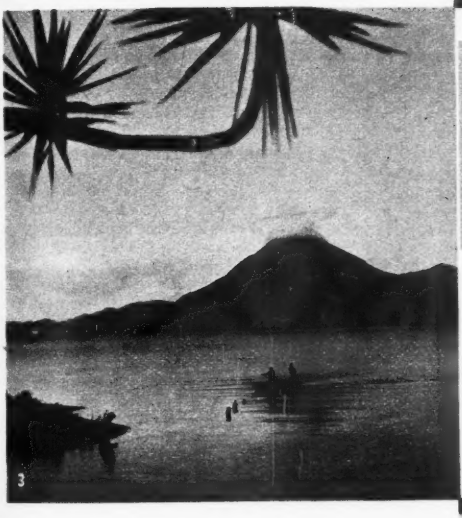
THIS dining-table accessory is useful as well as ornamental. Make the stoppers, covers, and paddles from scrap wood. The stoppers (Detail A) consist of hardwood pegs glued in holes in ordinary corks. The shot-glass covers are shown in Detail B and the paddles in Detail C. To make the turntable, glue two disks together after cutting and boring the holes in the upper disk (Detail D). For the railing, turn the six pegs shown in Detail F, bore a $\frac{3}{16}$-in. hole in each, and glue them to the turntable; then file the ends of the wire to form the joint shown, thread the wire in place, and force the joint into one of the holes in the pegs, thus concealing it. The base consists of a disk and four legs (Detail G). The hole in this disk is oversize to allow the spindle (Detail I) to rotate freely.

—*Charles and Bertram Brownold*



1 First Prize ($10.00) .....Dear Santa. Taken on a 4x5 camera by Stanley Silver of New York City. Illumination by strobe.

2



3

Monthly Photo Contest

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Please address your entries to: Photo Contest, *Mechanix Illustrated*, 67 W. 44th Street, New York 18, N. Y.

2 $5.00 Award .....Night Work. An interesting silhouette by Robert Weinberg of Brooklyn; Pan film, f-4.5 and 1/5th.

3 $5.00 Award .....Sunrise in Guatemala. Good example of framing by Max Hunn of Miami. Taken with a Rollei, 1/50th at f-4.

4 $5.00 Award ....."Boy, that's pretty good!". A Leica photo by Paul Arnoldi of New York City. Panatomic X, dull day, 1/30th at f-2.5.

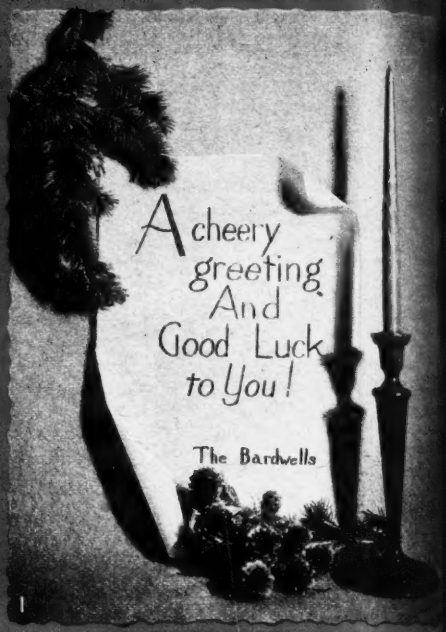
4

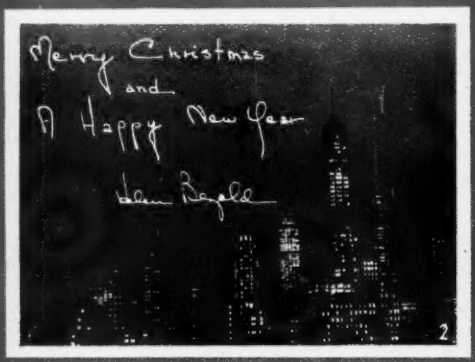
Christmas Cards With Your Camera

By Robert Brightman

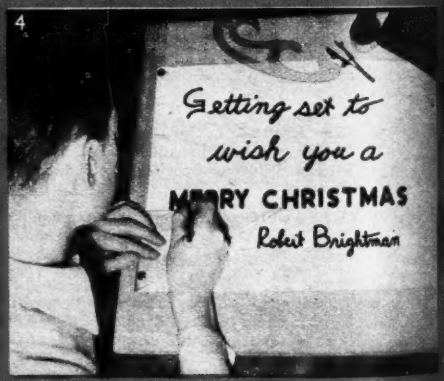
NOW is the time to get busy in your darkroom if you want to send out cards that will be a little different from the run-of-the-mine store-bought variety of greeting card. Shown on these pages are eight different types of cards.

The originals of most of these cards were printed on standard 4¼x5½ in. deckle edge, double weight paper. This paper, as well as envelopes to match, can be purchased from your local photo supply store. It is best to work with a 3¼x4¼ or 4x5 in. negative. Then your work will consist of a straight printing job. However, if you are a minifan all is not lost. Procure enlarging paper and project the image to the desired size. ●





1. This is a straight table-top picture with the message lettered with India ink for good contrast. A single No. 1 flood provided illumination. 2. Probably the easiest card of all to make. Message was simply written on the glossy side of the negative. Exposure for the night shot was 30 sec. at f-6.3 on Super XX film. 3. An indoor shot of your youngster spelling out a message with his blocks is particularly appropriate. The tiny figure at the left adds a bit of whimsey in keeping with the character of the set-up. 4. Here the photographer used a self-timer to get himself in the actual act of wishing his correspondents a Merry Christmas. A Speedball pen was used for lettering. Exposure was by one No. 31 flash lamp mounted on camera. 5. This is a combination of a commercial negative for the message part of the card and your own negative for the picture part. Exposure for figure was by means of two No. 1 floods; 1 sec. at f-22. 6. A combination printing job. Message



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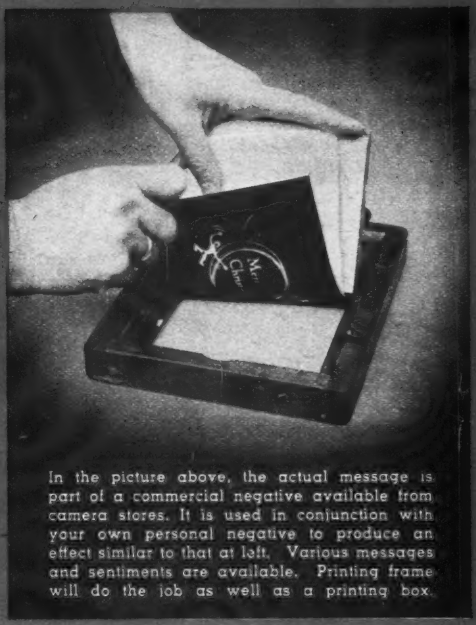
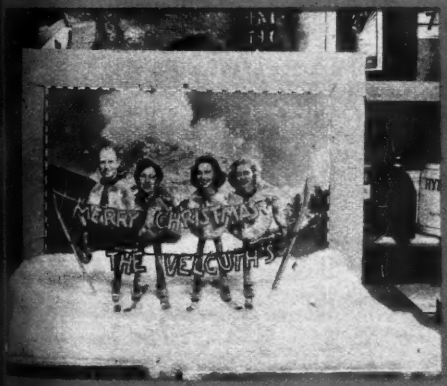
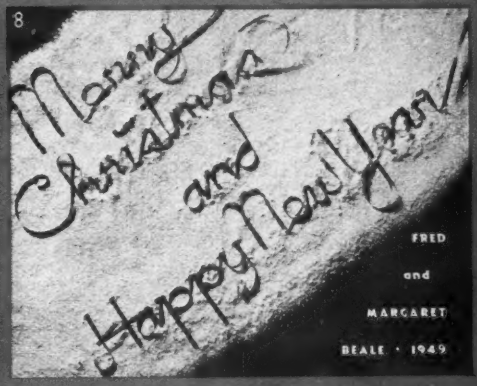


In the picture above, the actual message is part of a commercial negative available from camera stores. It is used in conjunction with your own personal negative to produce an effect similar to that at left. Various messages and sentiments are available. Printing frame will do the job as well as a printing box.

and signature lettered on white paper and then photographed on Kodalith film. This film yields a negative of much higher contrast than "process" film. You will have to cut this material down to fit your holders as it is not made in smaller sizes than 5x7 in. Cut out message and signature and arrange them around picture negative for best possible composition. Areas which are to print white are masked with black paper. Printing exposure should be for the picture negative. 7. Another table-top. This time portraits of the family were cut out and mounted on a string with a landscape photo as a background. The "snow" consists of cotton. This shows the actual set-up. Card as mailed consists of the area within dotted line. 8. This message was made by arranging scrap movie film in the form of a message on a background of salt. Movie titler letters were pressed into service to make up the rest of card.

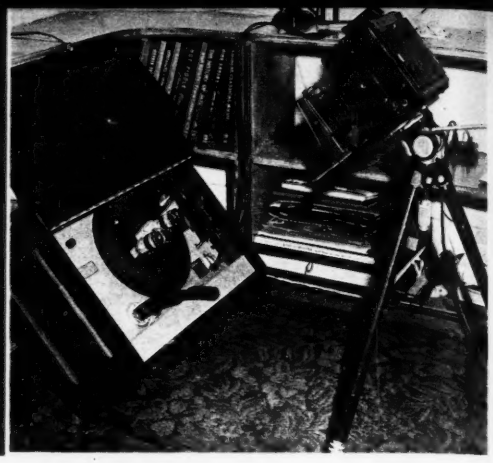
6

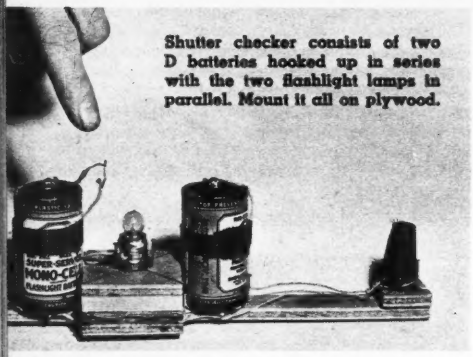




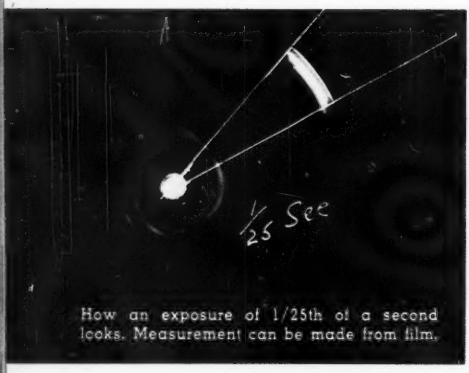
phonograph checks shutter speed

Are you certain your camera shutter is operating at 1/100th of a second? Here's how to tell.



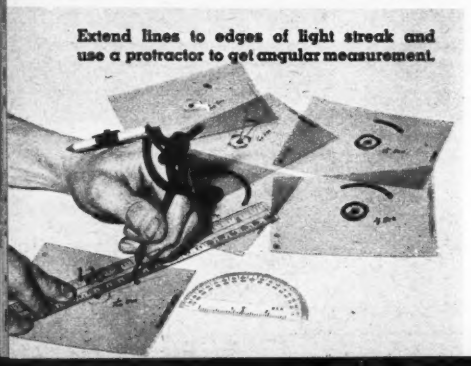


Shutter checker consists of two D batteries hooked up in series with the two flashlight lamps in parallel. Mount it all on plywood.



How an exposure of 1/25th of a second looks. Measurement can be made from film.

Extend lines to edges of light streak and use a protractor to get angular measurement.



WHEN using black-and-white film, minor shutter variations will be absorbed by the latitude of the film, but when using color film, which has very little latitude compared to black-and-white film, an inaccurate shutter may mean the difference between a perfect transparency and one fit only for the wastebasket.

A simple way of checking the accuracy of your shutter at various speeds makes use of the fact that standard turntables on phonographs revolve at a speed of 78 rpm. By using a flashlight bulb over the center of the turntable and one on the outer edge, setting up your camera about 3 ft. away and snapping the shutter as the bulb revolves, the resulting streak on the film can be measured in degrees.

At 78 rpm. the turntable will make a revolution of 468° in one second or 234° in a half second. The table below will show you how many degrees the turntable revolves at various fractions of a second.

To make the test, set up your camera as above. Focus on the ground glass to make certain that the revolving light is sharp, load the camera and set the shutter to 1/25th of a second. When you develop the film you will get a streak. Carefully draw two lines from the exact center of the lamp in the middle to each edge of the streak. Apply a protractor to the angle thus drawn and measure it. If it is equal to 19 degrees then your shutter is right on the head for 1/25th of a second. Continue in the same manner for the other shutter speeds.

—*Eric Wahleen*

TIME	DEGREES
1 sec.	468
1/2 sec.	234
1/5th sec.	94
1/10th sec.	47
1/25th sec.	19
1/50th sec.	9.5
1/100th sec.	4.75

photo posters

Give your local team a break by using photos of them in action as part of a poster.

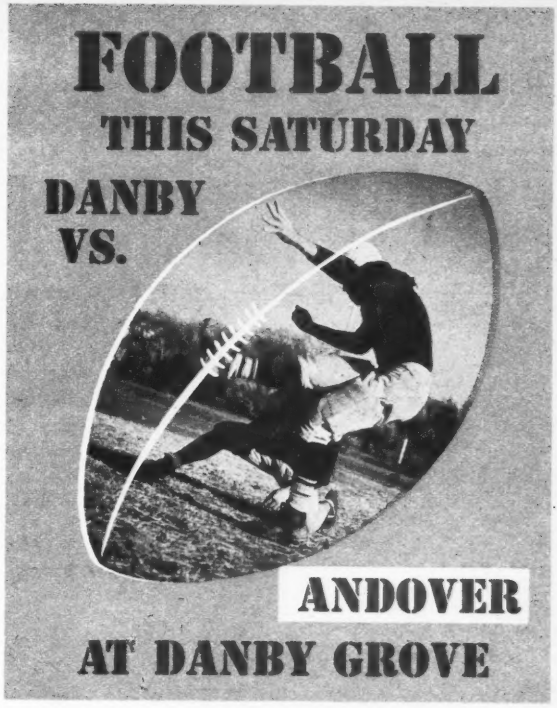
By Louis Hochman

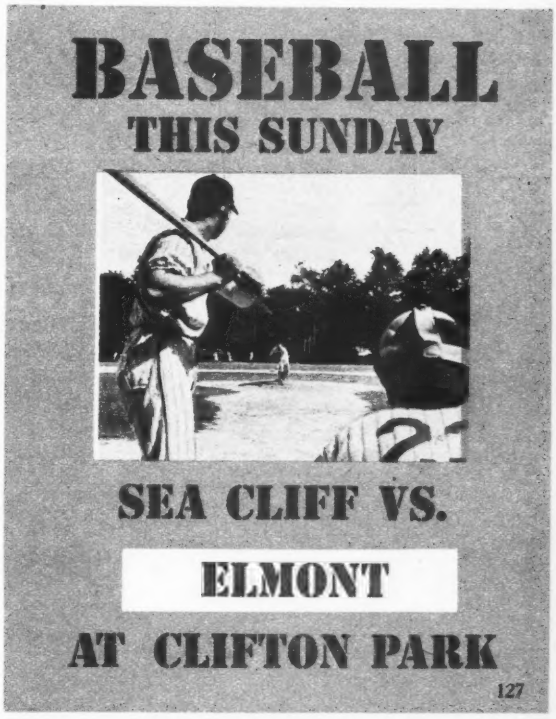
POSTERS have an amazing appeal. By simple pictorial designs and a few choice words or phrases, they convey powerful and impelling messages to their audiences. They serve many purposes. They help to elect candidates during elections. They call people to meetings, dances, and outings. They keep the public mindful of their civic responsibilities. And they inform the faithful of current football and baseball games.

Posters, as a rule, are made by talented individuals, who do a good deal of freehand art work on them. However, since we can't all be Rembrandts, we must find other means of illustrating our posters.

A well-conceived, photographically illustrated poster will generally attract more instant attention than a hand painted one. A poster tries to convey facts, and photographs *are* facts. The observer of a photo is seeing the McCoy, and therefore is more impressed by the printed message that goes with it.

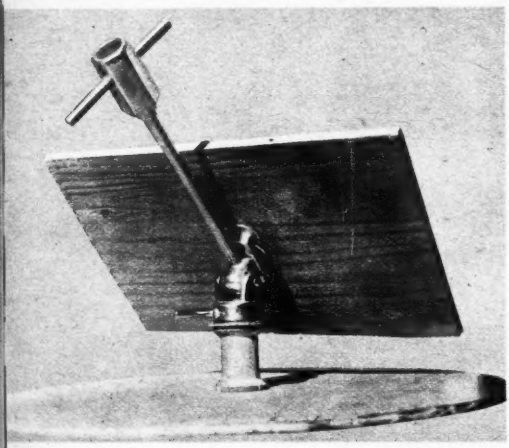
Now, with the football season in full swing, take some pictures of your high school in action and use them as shown in the poster at the top of this page. Note that all the lettering is stenciled. Inasmuch as the visiting team's name changes with each game, it is a good idea to print the visitor's name on a separate piece of cardboard which can be slipped into the poster through two parallel slots. •

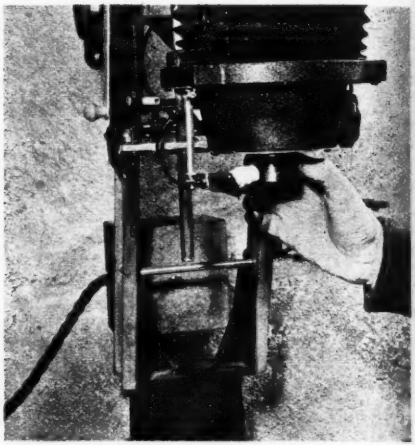


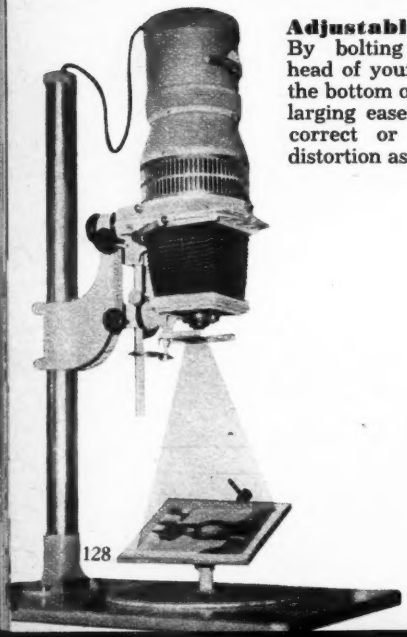


Negative Cleaner. The bottle of *Carbona* your wife or sister uses to take spots out of her garments, can also be used to remove fingerprints from negatives. Apply sparingly with a tuft of clean cloth. Allow fluid to dry thoroughly before handling again.

DARKROOM KINKS



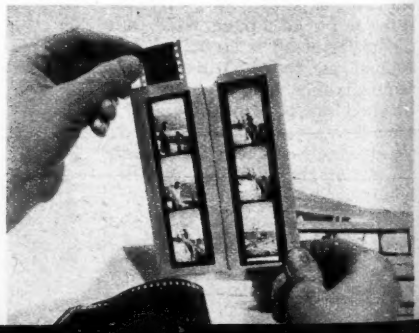




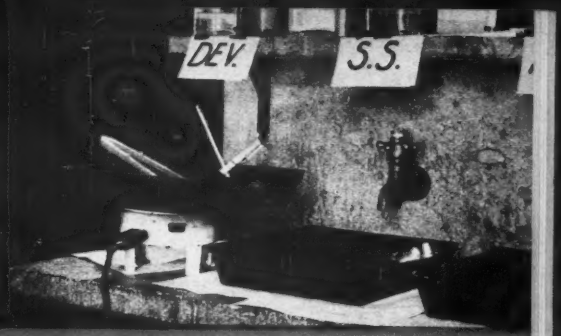
Adjustable Easel. By bolting the pan head of your tripod to the bottom of your enlarging easel, you can correct or introduce distortion as you want.

Diaphragm Finder. This one uses a 7½-watt pilot lamp shielded with fingernail polish. Adjust it so that it illuminates "f" values on diaphragm of enlarger lens.

Negative File. 35mm fans can improve the standard negative preservers by sewing a seam down the middle to form two compartments. Paste contact prints outside.

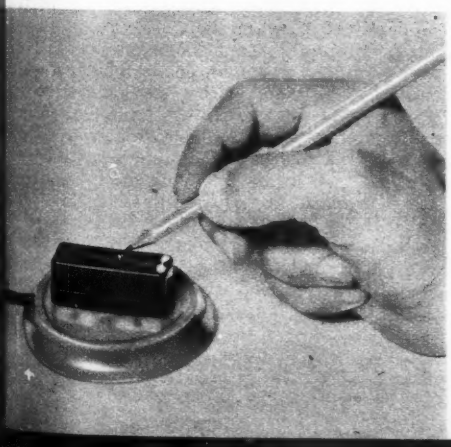


Developer Temperature. The addition of an electric hot plate to the darkroom is a handy winter accessory. Place the tray containing the developer on top of it and turn switch off and on as needed to keep solution at the recommended temperature.



and TIPS

Foot Switch. A war surplus microswitch makes an excellent foot switch. Mount it on a plastic coaster. This will serve as a base and also keep the connecting terminals off the floor. A hole in the side of the coaster passes the cord to the enlarger.



question box

By Robert Brightman

If you want a personal reply, please include a self-addressed, stamped envelope.

Is the milky appearance of unfixed film due to the silver bromide in the emulsion or is it due to the anti-halation backing? Wayne Shipley, Excelsior Springs, Mo.

The milky appearance of developed film is the actual emulsion of the film. The anti-halation backing is usually green or brown on panchromatic film and red on films like Verichrome.

I have a set of 6½-in. condenser lenses. Can I use them with a 3¼ in. enlarging lens? H. O. Kuntze, San Diego, Calif.

When you build an enlarger the focal length of the condensers should match that of the lens you are planning to use.

What information can you give me about a No. 4 Eastman camera? F. D. Bailey, Corvallis, Oreg.

This is a real, old-timer; probably made about 40 years ago. It was originally equipped with a rapid rectilinear lens. It had a value of about U. S. 4, the equivalent of f-8. It used No. 104 film which is still available from the Eastman Kodak Company.

In making an enlarger should I use opal glass with condensers or condensers alone? Harry Kurpiel, Chicago, Ill.

There is no point in using opal glass if you are going to use condensers. Use one or the other, not both. If you use two condensers, each one should have a focal length equal to the diagonal of the negative you are planning to enlarge.

What is meant by "Infinity" on my camera? Julius Savickas, Jr., Minocqua, Wis.

"Infinity" on most cameras means any point which is more than 100 ft. from the lens.

What is the "f" value of my meniscus lens? Roy N. Rose, Westboro, Mo.

Most single meniscus lenses have a value of about f-14.

"RC" Special

[*Continued from page* 105]

slightly slanting the upper faces of the bearers so that the motor, when mounted, will have a thrust line inclined downward. This is one of the secrets of the airplane for down thrust permits a higher flying speed, hence better control response and maneuvers without power stalls. The bearers are 1¼x⅜ in. hardwood, cut to the shape shown on the side view. To assemble the nose compartment, begin with the $\frac{3}{16}$ in. plywood firewall, a front elevation of which is given on the fuselage plan. Note how the firewall fits against the front fuselage cross pieces, being notched to fit around the longerons at the corners. After drilling the motor bolt holes, insert the bearers through the holes in the firewall, taking care that each bearer projects precisely the same distance for engine alignment. Then fill in around the rear ends of the bearers with hard ¼ in. sheet balsa. This filling material should entirely fill the fuselage stations at the front edge of the cabin door. All joints should be carefully glued; first coating rough surfaces to fill, then coating joints after one gluing has set up. Cut out and add the ⅛ in. thick plywood braces to the mounts and the ¼ in. square balsa strip corner braces to hold plywood evenly against the firewall. (See both side view and the detail of firewall.) Note that another ⅛ in. plywood brace is glued to the top of the bearers, forward of the firewall. The battery strap is .015 or .020 brass, held down by 2-56 round head machine screws, the nuts for which are glued permanently beneath the plywood. Commercial pack battery holders are available and should be used if obtainable in your locality.

The Aero Spark coil fits into notches cut into the tops of the bearers (See side view); all wiring for ignition must be completed before formers F-1 and F-2 can be put in place. Note that a choke hole for access to the engine air intake is cut through the far side mounts and plywood brace. To make this hole, use any convenient drill of approximately ¼ in. diameter and then enlarge the hole with a round file. Another hole must be drilled in the plywood piece on top of the mounts to permit the engine needle valve to descend through to the fuel tank. Note that $\frac{1}{16}$ in. aluminum or $\frac{1}{32}$ in. brass strips protect the bottom and top surfaces of the bearers where the engine mounting bolts go through. Coat the surfaces of the bearers, the plywood braces, and front face of the firewall with at least two coats of glue as protection against softening by the fuel.

RADIO MOUNTING: The radio receiver is shock mounted by means of double loops of ¼ in. flat rubber suspended tautly from hooks attached to the inside of the cabin on either side, and to the front and rear of the radio. Despite the apparent closeness of the batteries, cross pieces, and so forth, the radio was never damaged through contact with structure. Soft sponge rubber can be added to wood immediately in front of the radio, if desired. The four suspension hooks are bent to shape from .030 wire, as seen on top and side views, and are glued in place and bound with heavy thread. Give a second coat of glue after the first one has dried.

CABIN DOORS: A large, realistic door is provided on the left side of the fuselage to permit easy access to the receiver for making adjustments to the relay, or connecting and disconnecting leads. You may prefer the door on the right side. In any event put the door on the side away from your engine exhaust to prevent oil seeping into the cabin and radio gear. Material sizes are given on the fuselage drawing. A ⅛ in. square strip door-stop runs around the door opening so that the door rests against the stop when closed. This stop, however, is eliminated where the door hinges are located. Hinges and door catch are shown in detail. The curved corner fill pieces are made from soft ⅛ in. sheet balsa and are flush with the outer surface of the door. The celluloid fits within the door frame, with its corners behind the fill pieces.

For added strength and rigidity the entire forward section of the fuselage along the sides is filled in with ⅛ in. thick sheet balsa, as far back as the battery hatch door. This "mosaic" is made by laying the fuselage on its side and tracing the outlines of each opening between cross pieces, etc., onto ⅛ in. sheet balsa. Note grain directions indicated. When each piece is sanded and fitted closely into its proper place, remove it and rub a filler coating of cement over the edges that resulted when the sheet was cut then, when dry, recement and work the piece into position. The two sections that support the jacks and switches are not glued into position until the jacks and switches have been mounted as shown on the plans. It will be necessary to solder the light ignition wire leads used for the radio hook-up to both jacks and switches. Use small paper tags to label each wire as it goes in. The jumper jack shown must be used when RC flying the model, removed when testing with mille-ammeter.

UPPER CABIN: The wing center section actually is part of the fuselage and so is built into our framework at this point. The center section is assembled over the special detail

[*Continued on page* 132]

The Amateur Telescope Maker's Page

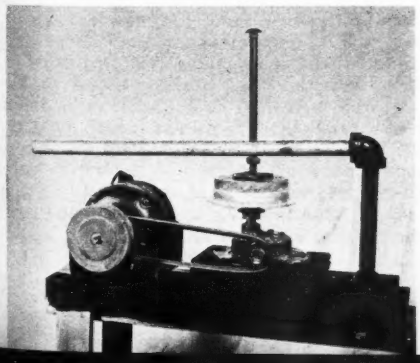
The head of the most famous comet of modern times, Halley's Comet, as it appeared on June 4, 1910. An 18-minute time exposure through the 60-inch reflector at Mt. Wilson Observatory. This comet is due to come back in 1986.

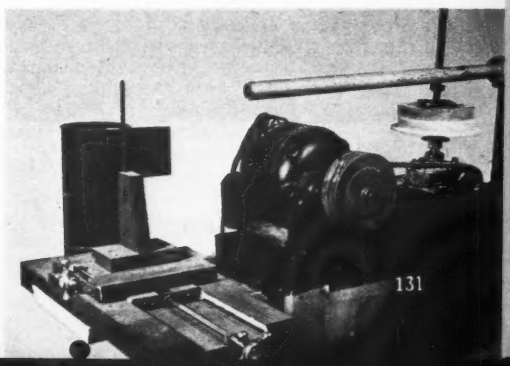
Conducted by Robert Brightman

IN response to numerous requests from readers on how to grind a mirror without walking around a barrel, we print the photographs at the bottom of this page. They show how Herbert S. Roberts of East Braintree, Mass., took all the fun out of mirror grinding by having an electric motor do the job. We hope that Mr. Roberts had as much fun constructing the rig as he would have had grinding the mirror by hand.

In a letter, he [*Continued on page* 166]

Carl Hayunga of Wyckoff, N. J. and the telescope he built from MI plans. A second finder behind the eyepiece is an innovation. Mount is set in concrete.





The Foucault shadow tester as made by Mr. Roberts. The knife-edge is controlled by long threaded rods for left and right motion as well as movement back and forth. The photo on the right is the grinding rig described in the text. It is driven by a ¼ hp motor and has a clutch to disengage the motor in case the tool sticks to the mirror.

[*Continued from page* 130]

layout. Note the tongue detail. This tongue is rigidly built into the center section and afterwards will slide into boxes in the wing roots to hold the outer wing panels in place. This tongue is built up of three ply; a 1/8 in. thick sheet balsa ply, then a 1/8 in. thick plywood ply, and finally on top, a $\frac{1}{16}$ in. thick sheet balsa ply. The two tongues are made separately and then joined together at the middle. Note that the outer portion of the $\frac{1}{16}$ in. ply of each tongue is not glued down, permitting shimming up with thin pieces of paper later on as the tongues wear in with service.

The first step is the construction of the box spars which are built up as shown from pieces of $\frac{3}{32}$ in. sheet balsa. Then cut out the three center section ribs designated Cabin Rib (shown on side view of fuselage) and W1-G. Cut out two of these ribs (Cabin Rib) from 1/4 in. sheet balsa, the third (W1-F) from 1/8 in. sheet balsa. Patterns are provided. Slide the three ribs over the spars, then slide in from the front the leading edge backing-up piece of 1/4x1/2 in., followed by the leading edge, also 1/4x1/2 in. stock but standing on edge. The leading edge should not be shaped yet. The trailing edge is constructed from two pieces of $\frac{3}{32}$ in. sheet balsa. Note how the bottom piece is beveled to provide a surface for a glue joint to the upper piece, holding both at the proper angle. When dry, slide the finished trailing edge over the ends of the ribs, which are coated with glue.

Before installing the tongues, pin the center section flat to the bench, and then trial fit the tongues by sliding them into position through the holes in the 1/4 in. thick ribs. Remove the tongues and coat all joint surfaces-to-be with cement and allow to dry, and finally glue the tongues into position. It is absolutely essential that these tongues be mounted true, so check the dimensions given on the plans for the tongue elevations. If necessary, make a cardboard template to fit beneath the tongue to check its angle. When the tongue is dried in place, put down the 1/4 in. sheet braces on top of it (see front view of center section). Afterwards, invert the center section and glue in the 1/4 in. sheet braces that fit beneath the tongue. Note that two pieces of 1/8 in. square balsa strip run across the center section, about a third of the way back from the leading edge. The top of the section is covered with $\frac{1}{16}$ in. sheet with the grain running crosswise. Butt this sheet against the leading edge, the 1/8 in. cross piece, and against the trailing edge. Be sure it is also glued to the rib tops. When dry, sand the top surface of the section to a smooth finish. Cement the completed center section to the top of the fuselage; glue well for considerable stress will be imposed in certain maneuvers. The front, top of the cabin, just beneath the leading edge of the center section, is made from 5/8 in. thick pieces of soft balsa, to the pattern shown on the top view.

Cut out formers F-1 and F-2 and glue in place as shown on the side view. Cover this section with $\frac{1}{16}$ in. sheet with the grain fore and aft.

LANDING GEAR: A Cessna type gear is used for maximum strength combined with great flexibility and shock absorbing qualities. The main landing gear struts are actually one piece, running through the bottom of the fuselage. Using the dimensions given on the detail, lay out the landing gear strut piece on the 11 or 17 ST aluminum. Use layout blue, or thinned out colored dope to coat the surface for scribing. Use any sharp point, such as a pencil compass, for a scribe. Cut the gear to outline with a hack saw and round the edges with a file. All holes must be drilled before any of the bends are made. Since it is virtually impossible to bend such heavy material without getting unsightly rounded corners. A bending brake is made to facilitate accurate bending. While the brake shown on the plan was made from aluminum scrap, a hardwood bending brake will serve the purpose. All brake dimensions are given. To make a bend, the sheet metal is clamped to the bench with large C-clamps, the line of the intended bend running along the outer edge of the bench, then the bending brake slides over the sheet metal. Note that the slanted surface of the brake will come in contact with the side of the bench when the sheet metal is bent down. This automatically gives a proper angle, as well as a clean bend. Make the wide bends first, then the bends close to the wheel axles. The sheet metal gear bolts into a plywood and balsa sandwich which is then built into the fuselage. This construction will withstand almost any blow. The sandwich to which the gear attaches is built up from 1/8 in. plywood on the bottom, with 1/8 in. sheet balsa on top. The bottom fairing block is 1x4x10$\frac{11}{16}$ in. The sandwich is cemented lightly and temporarily, then the fairing block is also temporarily mounted while shaping and sanding. Now remove both the block and the sandwich. The sandwich is drilled to take the 6-32 round head brass machine screws which hold the gear in position. Note the rubber shock cord hook which is bent from $\frac{1}{16}$ in. music wire. The upper edge of this hook is U-shaped to fit through two holes drilled in the metal gear.

[*Continued on page* 138]

Kodak Flash Bantam f/4.5 Camera—Fast f/4.5 Lumenized lens. 1/200 shutter synchronized for "flash." Automatic film stop. $49.50. Flasholder, $11.08.

Kodak Duaflex Camera—Three stops: f/8, f/11, f/16. Double-exposure prevention. $19.85. With fixed-focus Kodet Lens, $12.75. Flasholder, $3.33.

Kodak Tourist f/4.5 Camera New 1/800 shutter, $95. With f/4.5 lens, 1/200 shutter, $71. With f/6.3 lens, $47.50; f/8.8 lens, $38.50; Kodet Lens, $24.50. Flasholder, $11.08.

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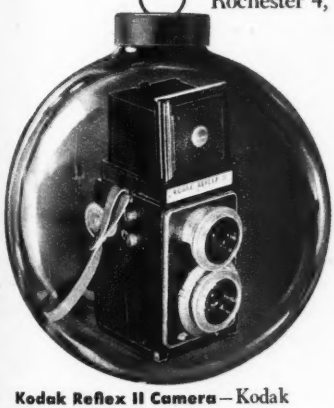
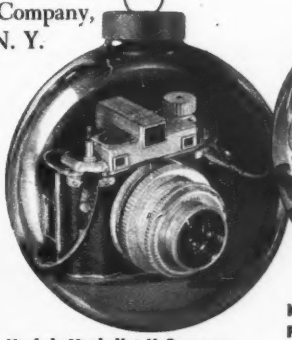


Kodak Reflex II Camera—Kodak Ektalite Field Lens boosts image brightness 2½ times. F/3.5 Lumenized lenses, 1/300 shutter, film stop. Negatives, 2¼ x 2¼. With case, $155. Flasholder, $11.08.



Kodak Medalist II Camera Finest lens in the 2¼ x 3¼ field—Kodak Ektar f/3.5. 1/400 shutter, coupled range finder, automatic film stop, depth-of-field scale. $312.50. Flasholder, $11.08.

Kodak 35 Camera with Range Finder—For miniature Kodachrome photography. 1/200 shutter, automatic film advance. $86.75. Flasholder, $11.08.

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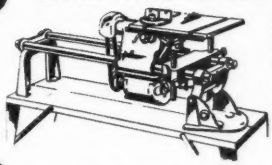
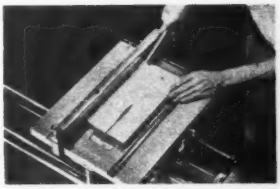
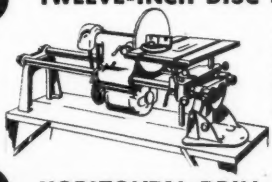


Effective table width up to 56". Maximum depth of cut, 2¼". Machined tilting table, ribbed for extra strength. Precision-tooled rip fence and miter gauge. Unique micro-adjustment permits extremely accurate ripping.

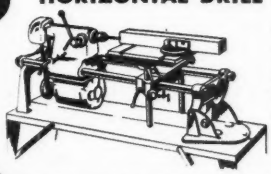


2 TWELVE-INCH DISC SANDER



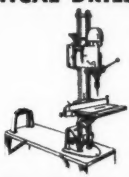
Cast-aluminum disc easy to attach and remove. Extra-large, adjustable table measures 14½" x 17". Miter gauge and rip fence can be used for accurate squaring and jointing. Has features found in no other disc sander.

3 HORIZONTAL DRILL PRESS

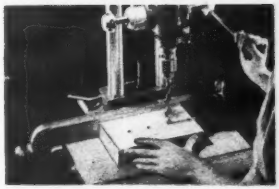


Extremely useful operation possible only with SHOPSMITH. 4" quill feed, automatic stops. Permits large, heavy pieces to be drilled or mortised quickly and accurately. Eliminates need for jigs. Length of work limited only by size of room.

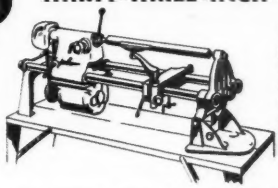
4 VERTICAL DRILL PRESS



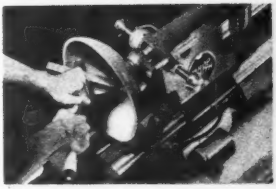
SHOPSMITH drills to the center of a 15" circle, has a maximum clearance table to chuck of 27". Jacobs key chuck takes drills from 5/64" to ½" diameter. Rugged, six-spline spindle with 4" feed. Variable speeds 875 to 3500 rpm.



5 THIRTY-THREE-INCH WOOD LATHE



With a 15" swing, SHOPSMITH has greater capacity than most other heavy-duty lathes. Distance between centers, 33". Swivel-arm tool rest always slides parallel to ways—no need for constant adjusting. Has 4" quill feed. Quickly adaptable for oversized faceplate work.



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Coffee-Dining Table

[*Continued from page* 98]

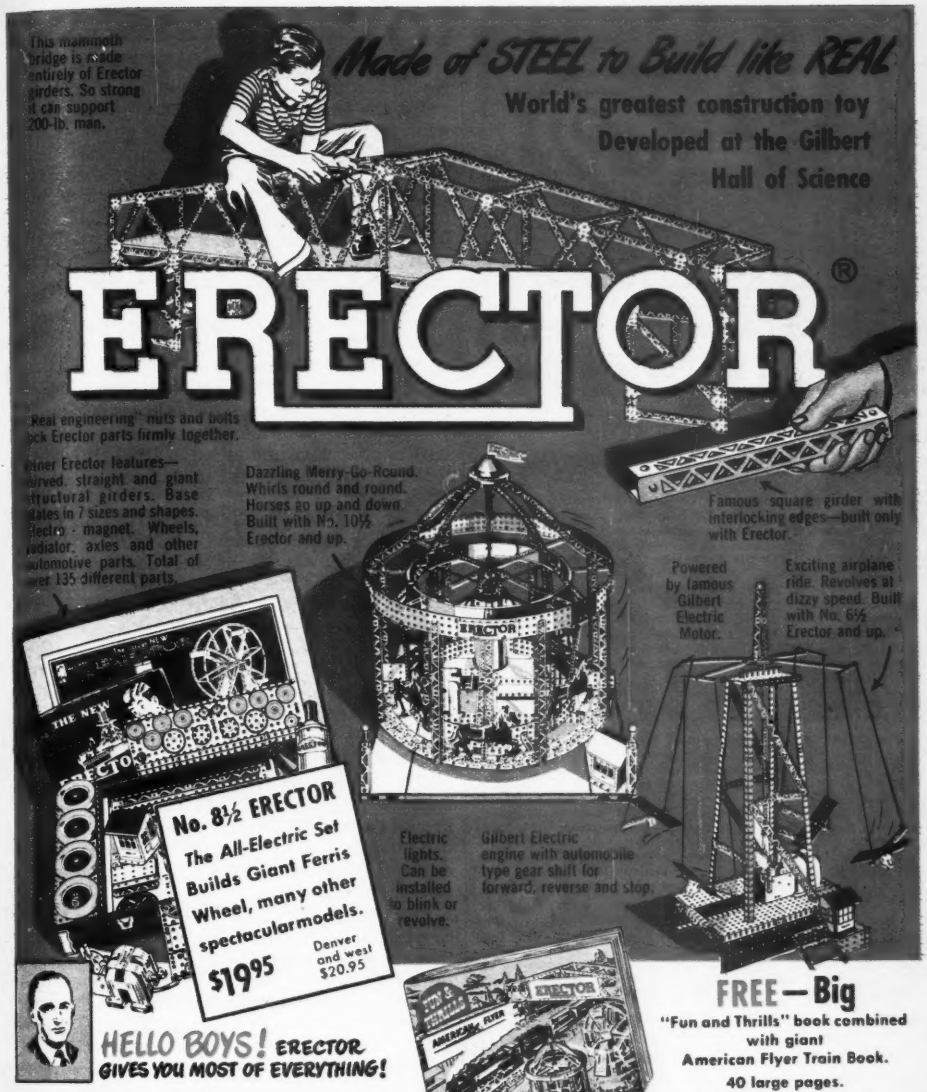
indicated. Veneer the edges and set this assembly aside. The legs were built up from 1 in. thick primavera to match the Korina wood because solid stock was not readily available. Cut the legs to size, glue and then cut the angles after the glue is thoroughly dry. The cross pieces are built up in exactly the same manner as the legs and ripped to the cross section shown after the glue is dry.

Joining the cross pieces to the legs requires considerable care. First, mark off the position of the screws on the sides of the legs and then drill a ¾ in. deep hole with a ⅜ in. diameter spur bit. Then complete the hole with a No. 18 drill. After all the holes are drilled in this manner, clamp the legs with the cross pieces in place and drill a pilot hole (No. 40 bit) in the cross pieces. This is very important else the wood will split when the screws are driven home. Remove the cross pieces, blow out the sawdust and then glue and clamp the legs together. Screw the 4 in. No. 8 screws in place, cut 1 in. plugs with a ⅜ in. plug cutter from scrap primavera wood and glue these in place. The plugs will protrude about ¼ in. and are cut off before the legs are sanded and finished.

After both leg assemblies are dry, remove the clamps and, along with the other visible surfaces of plywood, start with the finishing.

First apply a coat of transparent wood filler. Now apply two coats of 5 lb. shellac, cutting it to a 60-40 mixture of shellac (60) and alcohol (40). Rub with 00 steel wool between coats and then brush on two more layers of shellac, this time using a 65-35 mixture. Continue to rub between each coat with the steel wool and then apply two more coats, adding more shellac so the ratio is 70-30. Rub down again and apply the last coat of shellac, which is a 75-25 mixture. Steel wool all surfaces thoroughly and then mix enough No. 20 motor oil with pumice stone to produce a paste. Peel off the protective covering on the Micarta and rub this compound on the rough edges of the Micarta and all other wood surfaces. After the surface is glass-smooth, clean with a soft rag dampened with benzine. To assemble, carefully set the top and side and dining table leaves upside down on a smooth surface and screw the piano hinges in place. First drill mark the holes in plywood with a scriber. The pivot point must be exact so take your time.

After the hinges are in place, carefully screw the legs to the leaves, applying a bit of glue in the screw holes. Add the block containing the pivot latches which hold the legs to the bottom and the job is complete. •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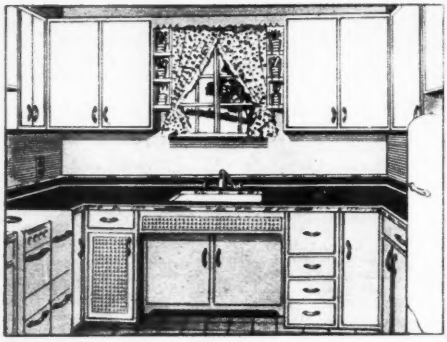

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"RC" Special

[*Continued from page* 132]

Notch the plywood to fit over this hook. Finally, the gear is bolted in place on the sandwich and the whole assembly is glued well to the fuselage bottom. The final operation is to notch the fairing block to fit over the metal gear, slotting the block to slide over the rubber shock-cord hook, and then glue the fairing block in place. The axle is bent to shape from ⅛ in. music wire. The wheels are held on by wheel locks, but washers may be soldered to the axle ends.

When the gear is securely in place, add former F-3, and complete the bottom fairing with the ¼ in. square stringers. The tail wheel is 1¼ in. diameter. Like the main gear wheels it is a Veco product. The axle is .062 music wire bent as shown in the detail and sewed with copper wire and glued to a ⅛ in. plywood former, that glues to the face of the tail block. (See side view.)

STABILIZER MOUNTING GUIDES: These guides are for the purpose of guiding a thin screw driver up from the bottom of the fuselage to the machine screws that hold on the stabilizer. The heads of the stabilizer hold-on machine screws (6-32 round head brass) fit flush against the fuselage cross pieces. The tubing is aluminum with 5/16" outside diameter and ¼" inside diameter. The front tube fits snug at the top against a cross piece of the fuselage; this cross piece is drilled to permit passage of the machine screw, but not the head. The front tube also butts against a bottom cross piece to which it is firmly glued. The hole for the rear tube was drilled previously, but note that it, too, butts against a top cross piece in the same manner as the front tube.

The antenna is mounted externally and extends from the fuselage top at the wing trailing edge to the top of the rudder. Because the antenna will be clipped to its proper length (as per radio instructions) a front mounting screw will be all that is needed now. Drill a hole through the center of the crosspieces at the wing trailing edge for a 4-40 or similar size machine screw. Later the external portion of the antenna can be soldered to the bolt on top of the fuselage and a short lead to the receiver can be attached inside the cabin and held in place with the nut on the bolt.

The escapement leads run along the inner corner of the top longeron as shown on the side view. Fahnstock clips for attachment of the escapement leads are fastened to the inner face of the longerons at the rear.

COWLING: The cowling is built up from five medium soft balsa blocks. The side blocks

are ⅞ in. thick, allowing for spoilage. The bottom and top blocks are ½" thick. The blocks are assembled together as shown in the detail, then shaped and finally routed out with wood chisels to a ¼ in. wall thickness. Note that the grille is made from 1/16 x ¼ in. hard balsa strips; also the ⅛ in. plywood ring that faces the propeller spinner. A system of five ⅛ in. thick dowels and mounting holes in front of the fuselage hold the cowl snugly in place. These holes can be drilled with a 7/64 in. drill and brought up to size with a ⅛ in. reamer. This insures a very snug fit. The drain tube is ¼ in. aluminum. The cooling louvers are made from heavy celluloid, glued in place. Choke holes and exhaust holes can be cut out as shown. Don't worry about the timer arm, it can be bent down until it almost touches the crankcase to clear the inside of the cowl.

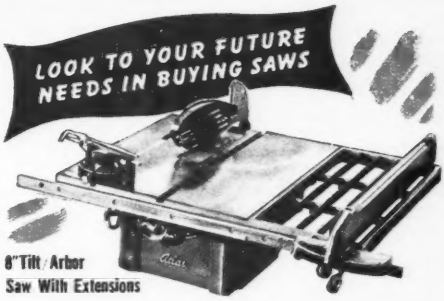
Flight testing will be done without the cowl. After the ship is flying properly and the engine throttles down reliably the timer arm is locked in one position and never moved. Only then is the cowl put in place. The slotted head of the needle valve can be adjusted with a screw driver, or a standard extension can be soldered to the regular needle valve and extended through the cowl top.

TANK: The fuel tank is made from .015 shim brass. A pattern is provided. Edges are easy to solder. Avoid acid-core solder which damages the brass. By using a "sump" and air pressure vent (which runs to the outside slip stream) a steady flow of fuel good to the last drop is insured. Be sure to attach an extension of neoprene tubing to the Ohlsson needle valve body to reach the bottom of the "sump," which is then soldered onto the tank as shown. One of the copper tubes shown is for filling with fuel, the other is the air pressure vent. If desired, a block may be glued to the firewall to provide additional support for the tank.

WINDOWS AND WINDSHIELD: Make a paper pattern by trial and error for the windshield, then cut out the celluloid accordingly. Glue along the center section edge first, allow to dry, then bend back flaps to reach cabin windows. Build up a bead of cement along front edge of windshield. Cut the celluloid windows to fit *within* the frames and glue neatly in position. Leave corners square because they fit behind window corner fillets.

COVERING: All the assemblies really are covered before final assembly, but the technique will be described assembly by assembly. The fuselage is covered with four pieces of silk, one for each side, the top, and the bottom. While covering include the bottom fairing blocks, the top of the center section, and the nose and tail blocks. Run the front covering

[*Continued on page* 140]



This Big-Capacity *Atlas* Will Serve You a Lifetime

A table saw is the basic tool in woodworking shops — most often used, most valuable. It *always* pays to get one big enough for *all* your future needs. And it pays you particularly to get an Atlas with its extra-large, *precision-ground,* smooth-surfaced table, tilt/arbor design, quick-adjusting, *double-locking* rip fence, easy operating controls, and sealed *ball bearings.* With an Atlas 8" or 10" saw in your shop you have accuracy for the finest workmanship, plus capacity for almost any project you'll ever want to undertake. See it at your Atlas dealers—send the coupon or a postcard for latest catalog.

Features You'll Value

Big Capacity — 8" saw table 18" wide — 22" front to back — 10⅝" surface ahead of blade. Two low-cost extensions make table *35½" wide!* Cuts 2⅜" deep.

Tilting/Arbor — table is *always flat* for safe angle sawing.

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ATLAS PRESS CO.,
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1252 N. Pitcher St., Kalamazoo, Mich.

Atlas — Atlas Power King

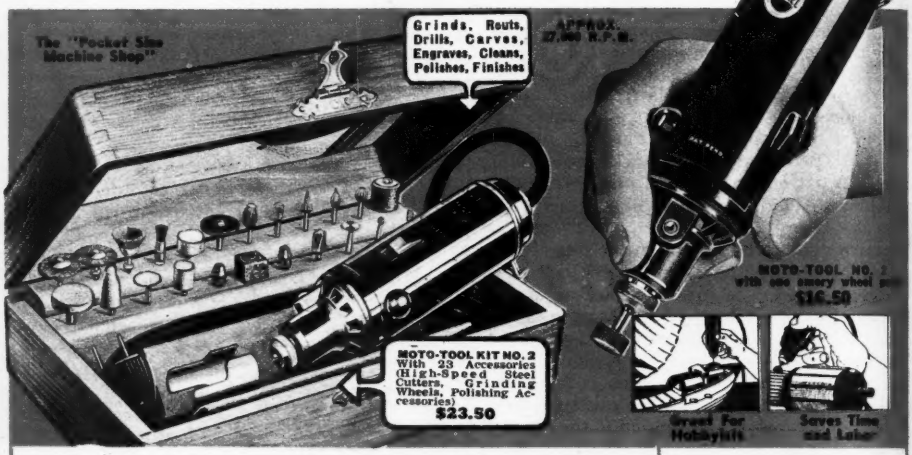
MATCHED PRECISION TOOLS FOR WOODWORKING AND METALWORKING

[*Continued from page* 139]

over the edge and face of the firewall for added strength. The nose cowl may be covered with smaller sections of silk. Wet the silk as you cover. Simply dip the material in water or let water trickle over it, and then lay and stretch the material on the framework. If the framework is given an initial coat of dope it will help fill the pores and provide a good surface for attaching the silk. Dope the silk down as necessary while wet. Start at one end, then, having stretched the material as well as possible, dope down the opposite edge. Continue to stretch toward the outside edges and dope them down. Silk will follow double bends without trouble and it is no problem to work out wrinkles with the finger tips before the dope has held the material in permanent position. When the silk has dried out, give it a maximum of five coats of good clear dope to fill the pores. Close examination will indicate if more doping is necessary. Painting is left until after testing flying. Completing the "RC" Special will be described next month. •

The Ideal Christmas Gift

DREMEL *Electric* MOTO-TOOL

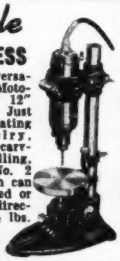


10 REASONS WHY MOTO-TOOL IS A BETTER BUY

Here's what you get in a Dremel No. 2 Moto-Tool: Oil-less, sealed bearings. Patented automatic chuck lock pin. Oversize armature shaft, hardened, ground, polished. Shockproof, bakelite housing. Dust filtered air cooling system. Dynamically balanced armature (for vibrationless operation). Exclusive hanger hook. Sturdy 110-120 Volt AC-DC motor. Weight only 13 oz. Cutters in Kit No. 2 are made of **high speed steel** (not common high carbon steel) for longer life, faster cutting.

Portable

DRILL PRESS



Add all-around versatility to your Moto-Tool with this 12" high drill press. Just the thing for creating costume jewelry, model making, carving, routing, drilling, etc. Utilizes No. 2 Moto-Tool, which can be raised, lowered or swung in any direction. Weighs 3¼ lbs.

Only $9.95
(Less Moto-Tool)

Moto-Tools, Kits and Accessories should not be confused with "bargain offers." We invite you to compare Dremel Products feature for feature with other similar equipment. If you are not fully convinced ours are far superior in quality, design and performance, we don't want you to buy.

WIDELY USED IN INDUSTRY—

Moto-Tool is a precision-built electric tool, backed by over 13 years of industrial use in such plants as: GENERAL ELECTRIC . FORD . REMINGTON ARMS . NASH-KELVINATOR . WESTINGHOUSE . DOUGLAS AIRCRAFT, etc.

PRE-WAR PRICES STILL PREVAIL

MOTO-TOOL KIT NO. 2 with 23 accessories including **high-speed steel cutters** and Model 2 Moto-Tool in natural finish hardwood case **$23.50**

MOTO-TOOL NO. 2 with one emery wheel point... **$16.50**

WHERE TO BUY—

Buy Moto-Tool from your dealer. If he cannot supply you, send check or **M.O.** for items desired and we will ship **postpaid.** Or, send only **$2** now and pay postman balance plus postage on delivery. **MONEY-BACK** if not delighted after 5 days' trial. Catalog of Dremel Tools **FREE.**

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Moto-Tool Kit No. 1 contains the lighter Model No. 1 Moto-Tool and 34 practical accessories (steel cutters, grinding wheels, etc.) in an attractive, lacquer-finish wood case. It's the biggest bargain in the field **$17.50**
MOTO-TOOL NO. 1 with one emery wheel point **$9.95**

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Popular Labor Saver for the HOME and SHOP

Makes play of wax polishing

Soothes tired muscles by massage

The popular Dremel Electric Sander is more than a sander . . . it's also a polisher and massager. This miracle machine is so easy to handle, a child can use it. It delivers 14,400 strokes per minute. **(1) As a sander,** it gets into tight corners, takes the effort out of sanding walls, woodwork, furniture, workshop projects, etc. **Its straightline (non-rotary) action will not burn or scratch surfaces. (2) As a polisher,** it does a professional job on waxed surfaces of cars, furniture, refrigerator cabinets, etc. **(3) As a massager,** it's ideal for tired or sore muscles of the back, legs or arms. Users testify it is more effective than machines made expressly for this purpose.

LOOK AT THESE DREMEL FEATURES

Dremel Electric Sander does all the work . . . you merely guide it. It weighs only 2½ lbs.; it's foolproof (has only two moving parts . . . never needs oiling). Quick-change clamps firmly hold abrasives and pads. Dremel Sander is sturdily built to give long, trouble-free service. Operates on 110-120 Volt, 60 Cycle, AC. Thousands and thousands of satisfied users **prove its outstanding value.**

WHERE TO BUY IT— **Dremel** Electric Sander comes complete with 6 sheets assorted grade Garnet Paper for sanding, plus felt pad and sheepskin for polishing. Buy it from your dealer. If he cannot supply you, use coupon below to order direct from factory. We ship **postpaid** if you send check or money order in full. Or, send **$2** now and pay postman balance plus postage, on delivery. **Money back** if not delighted after 5 days' trial.

If Your Dealer Cannot Supply You USE THIS HANDY COUPON ORDER FORM

DREMEL MFG. CO. • Dept.S149-M • Racine, Wisconsin

- ☐ Enclosed find $_____ (Check or M.O.) in full payment for items checked below. Ship **postpaid** at once.
- ☐ Enclosed find $2.00 in part payment for items checked below. I agree to pay postman balance plus postage, on delivery.
- ☐ Dremel Electric Sander _____ $14.85
- ☐ Dremel Electric Coping Saw _____ $ 5.85
- ☐ Free catalog of Dremel Electric Tools.

Name _____

Address _____

City _____ Zone ___ State _____

FUN FOR BOYS FROM 8 TO 80

DREMEL *Electric* COPING SAW

CUTS SCROLLS LIKE MAGIC—SANDS AS IT SAWS

For men who harbor a hobby or do their own repair work . . . for boys who like to make things . . . no other tool will give as much pleasure and satisfaction in the home or workshop for the small amount of money invested as a Dremel Electric Coping Saw. It works in any direction . . . delivers 7,200 strokes per minute . . . so easily, there is no effort . . . so smoothly, work needs no sanding. Makes child's play of tricky scroll designs . . . saws through ¾" medium hard wood at a foot-a-minute speed. Touch-of-the-trigger, foolproof action. Saw has only two moving parts . . . never needs oiling. Operates on AC current. Thousands and thousands of satisfied users.

FREE PROJECT PLANS

Plan for making six useful, decorative projects packed with each Dremel Electric Coping Saw.

WHERE TO BUY IT— Buy Dremel Electric Coping Saw from your dealer. If he cannot supply you, use the coupon to order direct from factory. We ship **postpaid** if you send check or money order in full. Or, send **$2** now and pay postman balance plus postage, on delivery. **Money back** if not delighted after 5 days' trial.

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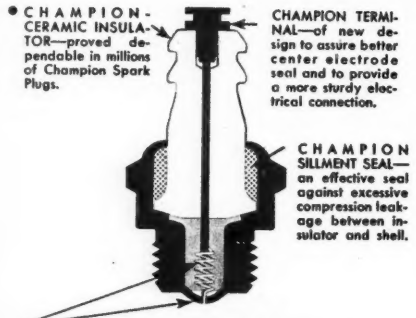
ANNOUNCING
CHAMPION
V GLOW PLUGS



• CHAMPION "THERM-O-FLEX" CONSTRUCTION*—an exclusive feature of Champion Glow Plugs which provides longer element life and more dependable performance. The special alloy coil element is held in proper alignment under all operating temperatures and is designed to flex without tendency to start circuit or break under repeated thermal expansion and contraction.

*Patent Pending

Champion Glow Plugs are designed to operate efficiently and dependably. Follow recommendations of plug types and fuels approved by engine manufacturer.

To the celebrated Champion V type *Spark* Plugs for model gas engines, Champion now adds V type *Glow* Plugs.

The cross-section above, with patented construction features indicated, illustrates the extent to which Champion's unexcelled research, engineering and manufacturing facilities combined to produce a *glow* plug with traditional Champion dependability. Available in three sizes for model gas engines.

"V" GLOW PLUGS	VG-1	VG-2	VG-3
"V" SPARK PLUGS	V	V-2	V-3
HEX	1/2"	3/8"	5/16"
THREAD	3/8"-24	1/4"-32	1/4"-32
THREAD LENGTH	7/32"	7/32"	5/32"
"V" GLOW PLUGS WEIGHT, GRAMS	VG-1 8.7	VG-2 3.7	VG-3 2.8
"V" SPARK PLUGS WEIGHT, GRAMS	V 8	V-2 3½	V-3 2½

Champion Spark Plugs for model gas engines give the same dependable performance as regular Champions. Champion Ceramic insulation—Sillment sealed, Alloy needlepoint electrodes for easy starting. One piece construction.

CHAMPION
SPARK PLUG COMPANY • TOLEDO 1, OHIO

Drunken Drivers

[*Continued from page* 83]

Another five minutes and a dial on the front showed that his blood contained .04 per cent of alcohol. Then Driver B followed suit. He registered .12 per cent!

At once, Powell knew two things. Driver A's figure was under .05 per cent, the line below which *every* adult is sober for all practical purposes. And Driver B's figure was close to .15 per cent, the line at which *every* adult is intoxicated.

As if to back up the Alcometer, Driver A now began to appear more sober as his nerves came under control. Driver B simultaneously began to slump in his chair, his glazed eyes revealing his true condition.

Satisfied with the results, Powell turned in his report. Thanks to the machine, he would appear in court with proof of each driver's status and justice would be dealt out to the guilty driver.

The Alcometer was born in Yale's famous Laboratory of Applied Physiology. It's a bit over two feet long and a foot high and weighs 45 pounds in its case. Powered by electricity, it operates automatically.

The subject breathes into the plastic tube and an exact sample of his breath is taken, then blown into a tube containing iodine pentoxide. Here, the alcohol is burned off and free iodine released in exactly the same proportion. The iodine travels to another tube containing starch, inserted beforehand by the operator. It colors the starch blue, the intensity of blueness being proportional to the amount of iodine. Finally, a photoelectric cell translates the degree of blueness in terms of alcohol concentration in the blood.

The Alcometer has five main advantages for use in police stations: 1) it's highly accurate; 2) it requires minimum cooperation from the subject; 3) it gives results in less than ten minutes; 4) it's fully automatic; 5) it gives a permanent record for presentation in court.

Chief objection to the machine is that, even though it can show exact blood-alcohol concentrations between .05 per cent and .15 per cent, it cannot diagnose the individual degree of intoxication in this range. Individual variations in "tolerance" to alcohol cannot be measured by mechanical means. In this range, the Alcometer still must be supplemented by the time-honored observation tests.

The Alcometer still must win wide acceptance by judges and juries—but police are certain that will come shortly. Everybody seems to be agreed that the Alcometer is certain to prove the greatest advance yet made in curbing the most explosive mixture on America's highways: gasoline and alcohol! •

MI Tests the 1950 Nash

[*Continued from page* 81]

wait for a dry track, let's join Daniel Boone McCahill and his Labrador retriever Joe for an adventurous trip to another part of Wisconsin. Into the Nash Ambassador we piled all the equipment necessary for a young Eskimo wife to start housekeeping and off we went into the wilds. Orin Benson, America's top retriever trainer, happens to live at Eagle, Wisc. My dog was beginning to tell me to go out and get my own ducks, so I thought I'd kill a few birds with one expense account.

Benson and I started out for the hills. We forded brooks, went up steep slimy banks, across open fields and through dense forests. I may be wrong but I think Benson was trying hard to see if we could dump the Nash. Once, as he guided me along the steep bank of one of the lakes, I could feel the ground sliding under the wheels.

At last we arrived by a lake full of mallards. Benson made Joe sit and watch his field-trial champions retrieve released ducks. Then, I am glad to report, Joe did everything just as well as the champs.

I want to go on record as saying that from the sportsman's angle this is *it*. You have radio, heater, screens and interior lights—everything but running water. By the time I returned to the proving grounds to make my tests on a dry track, I was convinced of two important things—first, this Nash Ambassador will really take a cross-country beating and second, Joe is a helluva fine retriever.

In my opinion, Nash is one of the most comfortably riding cars made in America. My only objection to its body design is that you can't see out the high back window as easily as you can with most other cars.

The new Nashes are true sport cars—but of an entirely different type than the Lea Francis or M.G. Unlike the sporting race car, these jobs can be used to take Aunt Matilda and her seven cats for a spin. Incidentally, Nash has a new interior wrinkle called a bin which replaces the old glove compartment. This bin pulls out from under the center of the dashboard so it's readily accessible to the driver as well as the passenger. It's big enough to hold a fifth of whiskey, too, in case Aunt Matilda is attacked by a mad horsefly.

On my way back from the West, I saw one of the Nash bed-cars pulled off Pennsylvania Turnpike for the night. So, don't get the idea they're good only on camping trips. In today's medium-price bracket, the Nash Ambassador certainly stands out for its versatility and comfort. It's a good car—even if you're old fashioned and prefer a hotel for sleeping. •

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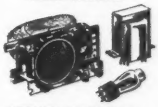

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Tough, long-lasting *Marfak* is made to take road punishment for 1,000 miles and *more*. Chassis bearings and friction points are protected *all the way* because *Marfak* resists squeeze-out, wash-out and shock. You know *Marfak* "sticks around" because you feel it—in that "cushiony" driving ease you enjoy from one lube job to the next. Ask for *Marfak* lubrication today at your Texaco Dealer, *the best friend your car ever had.*

MARFAK Lubrication

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TUNE IN . . . Metropolitan Opera broadcasts every Saturday afternoon. See newspaper for time and station.

FROM You TO You IF HINTS WON'T DO

YES, if you're not getting anywhere with hints that you'd like somebody to give you one of these handsome kits of Nicholson X.F. Swiss Pattern Round Handle Needle Files for Christmas, don't wait—give yourself the treat.

"X.F.," meaning "Extra Fine," is the mark of the very highest achievement of the file-maker's art. In a beautiful orange-and-blue plastic box with bottom stand are twelve fascinating file shapes (no two alike) applicable to most every possible use in model building, clock repairing, small die making, delicate instrument fabrication, etc. They're the pride of the hobbyist and precision craftsman, and come in over-all 4", 5½" and 6¼" lengths; in cuts Nos. 0, 2, 4 and 6. At good hardware stores.

ROTARY FILES and BURS, too, are tops for trueness, sharpness and long-lasting quality when bearing the Nicholson trade-mark. Made of high-speed steel, with files hand-cut and burs machine-ground from solid. Favorite assortments are: ROTAKIT No. 40—5 files and 5 burs with ¼" shank; and ROTASET No. 88 (illustrated)—18 burs with ⅛" shank.

NICHOLSON U.S.A.

NICHOLSON FILE CO.
49 Acorn Street
Providence 1, R. I.
(In Canada, Port Hope, Ont.)

BLACK DIAMOND TRADE MARK

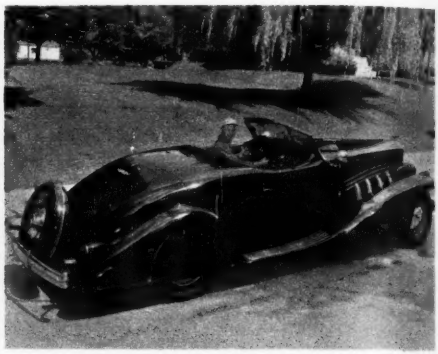
NICHOLSON FILES FOR EVERY PURPOSE

Dear Editor

[*Continued from page* 35]

Last of The Duesenbergs

Ever since they hit the market, I have despised the blown-up bathtubs that auto manufacturers have been selling. I much prefer the car in the photo enclosed—it's a Duesenberg Convertible Coupe, Model SJ and one of the last of this famous make to leave the factory. It's a pleasure to hear the squealing tires of modern heaps of tin getting



fainter and fainter behind me as they try to keep up.

J. E. Gebby
Dayton, Ohio

Our Gabby Feathered Friends

Your story on Wordy Birdies (July MI) was a very amusing feature. I was wondering whether you read a recent newspaper story which is a natural follow-up.

It seems that a gabby parrot named Lorchen was owned by the proprietor of a store in New York. Whenever a customer entered the store, the parrot would shout "Help! Lemme out!"

One day recently, when the parrot set up its usual clamor, not a soul bothered to go and see what was going on. Lorchen kept shouting "Help!" but the neighbors just shrugged their shoulders and muttered under their breaths.

Later in the day, when a customer entered the store, he found the owner tied up and the cash register looted of over $744!

Lorchen was still shouting "Help! Lemme out!"

J. K. Kule
New York, N. Y.

And then there's the one about the old maid and the parrot. . . .

Fighting Words From A Farmer

As far as sending McCahill back to the farm as a couple of readers wrote (October MI), that is no insult at all. Today, a farmer has to operate several machines and also know how to repair them.

So, if you want to insult Tom you'll have to think of another method. But why bother —I think he's great!

Lynn W. Hosier
Fairport, N. Y.

M. G. Versus Chevvy

Who in his right mind would want to drive a rough riding English M. G. when, for a cheaper price tag, he can take his whole family in a Ford or Chevrolet and ride in comfort. I own an M.G. and a Chevrolet. I can make trips of 300 miles or more in the Chevvy and still be in shape for a game of golf but after making the same trip in the M.G., I'm ready for a chiropractor.

Glenn Williams
Fox Lake, Ill.

In Defense of M. G.

McCahill implies that I have a hole in my head. In the September MI (Auto Road Racing Comes Back) he stated that the M. G. was a fine car *but* that "anyone, such as a salesman driving from coast to coast, would have to have holes in his head to choose an M.G."

I resent that, as I chose an M.G. without a moment's hesitation and, I'm happy to add, without a moment's regret. I drove my M.G. from east to west coast, averaging 600 miles per day and had a wonderful time doing so. In addition I have participated in every sports car event within several hundred miles of Washington, D. C.

Let Mr. McCahill try that on his Ford and then see who has holes in whose head.

Neal A. Allen
Patuxent River, Md.

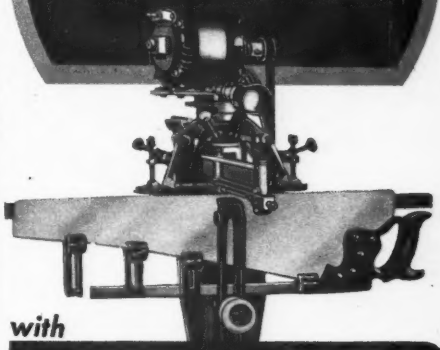
Tip To Craftsmen

Here's some information from which MI readers may be able to get an idea for their own locality. A high school in Terre Haute offers machine shop courses at night at a cost of $3 for 12 weeks. It's possible for students of these classes to make power machines from unfinished castings at very considerable savings.

J. R. Hornbrook
Marchall, Ill.

[*Continued on page* 148]

Made $900 IN SPARE TIME



with FOLEY* automatic SAW FILER

*Trade Mark Reg. U. S. Pat. Off.

"I did very well last year with my Foley equipment, about 950 saws and 240 lawn mowers, in my spare time. About $900 for me." Leo H. Mix. Len Crego says: "I have done 4 or 5 thousand saws in my spare time in the 4½ years since I got the outfit, and they are all coming back."

Make up to $2 or $3 an hour in Spare Time. With the high prices of food, clothing and everything else, just think what you could do with extra money every week! With a Foley Automatic Saw Filer you can file hand, band and circular saws better than the most expert hand filer. "The first saw I sharpened with my Foley Filer came out 100%"—writes Clarence E. Parsons. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings you more customers. Cash business, no canvassing. No eyestrain, no experience needed.

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Shows just how you can start at home in spare time in your basement or garage. Just think—with a small investment, no overhead, no stock of goods to carry, you can get right into a cash business—and later on develop into a full-time repair shop. Send coupon today for this practical plan.

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Gentlemen:
I have been unable to purchase your Model F-2 Flexible Shaft Tool Kit from my local dealer. Will you kindly forward me_____of these kits. My check or money order for $2.00 ☐ (balance COD) or $19.95 ☐ for each kit (Postpaid) is enclosed. Please credit my dealer,_____
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City and State_____

Dear Editor

[*Continued from page* 147]

Non-Moneymaking Idea

In reference to Mr. Newl's letter about non-moneymaking ideas (September MI), I'm willing to admit I messed up a good idea.

My story began in 1937. I was then a helper-mechanic and conceived the idea of a plane that would be hard to stall, impossible to spin and simple to operate. It seemed to me that student-pilots spent too much time on the ground.

I did some experimental work on it but did not apply for a patent. It was only later that I discovered that the device—the use of linked rudder and aileron controls—was covered by somebody else's patent!

Today I'm busy perfecting a revolutionary roadable plane—but that's another story!

Rene Charette
Ottawa, Ontario

Two Cars For One

The unsatisfactory performance and design of the modern car has been brought about by feminine influence. However, my wife and I have solved this matter to our mutual satisfaction.

We simply bought two old cars instead of one new one. I drive a slightly souped up 1936 Ford V-8 coupe that gives A-1 performance while she drives a 1938 Pontiac that is very smooth riding but which couldn't pull a greased hat off a bald head.

I keep 'em both in good mechanical condition but my wife drives her car and I drive mine. And to heck with the new ones.

Emmett Casey
Phoenix, Ariz.

Mr. Casey doesn't say whether or not he's a used car dealer.

Wanna Build a Boat?

In all of your issues, you print plans for boats—big boats, runabouts, sailboats, etc. I have a five-hp Sea King outboard motor. How about the plans for a six or seven foot hydraplane that I can get 25 or so mph in?

Richard Stauffid
Grand Rapids, Mich.

Here's a tip that'll interest you: the tenth edition of How To Build 20 Boats will be available at your newsstand around January 6. In it you'll find an eight-foot high-speed hull for use with just such a motor. Don't get seasick!

It's The Legs That Count

You called the spider an insect (Spiders Spun Her Career, Oct. MI). If you will look in an encyclopedia you will find the spider is an Arachmida. Insects have six legs; Arachmida have eight.

Can't you count higher than six?

Fred Young
Charlotte, N. C.

One, two, three, four, five, six, seven, eight, nine, ten. See—all the way up to ten. However, just to keep the record straight, the term insect, as distinguished from Insecta, usually refers to any small invertebrate animal.

Lazy Driver Warning

How's this for an idea for drivers too lazy to give hand signals?

Put a switch on the accelerator mechanism, hook it across the ignition switch so it can be used with the ignition turned on and then attach it to the stop light or an auxiliary warning signal at the rear of the car. When releasing the accelerator to slow down, the switch would complete the circuit, giving a warning to the car in back that the driver is contemplating some movement other than continuing straight ahead.

Earl G. Creamer
Pasadena, Cal.

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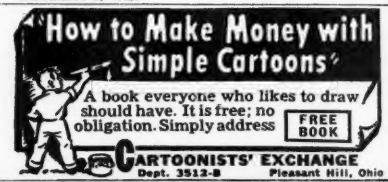

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Million-Dollar Toy

[*Continued from page* 63]

production it's estimated that she receives royalties of over $50,000.

Newest entry in the doll sweepstakes is one invented by a California woman named Mrs. Elvy Kalep. Her doll has a blank plastic face and comes dressed in an apron containing several crayons. The owner draws the face herself and it can be erased and redrawn indefinitely. That's scientific, you see—it nurtures the child's artistic impulses.

But science was far from the mind of Vernon G. Eisel, a Brooklyn office worker, when he produced the idea that wowed the toy industry. Eisel was moved by stern necessity. Nine years ago, his wife had premature twin girls. At the age of four months it was noticed that one of the twins had injured her neck muscles and could hardly turn her head.

Eisel reasoned that exercise might loosen the stiffened muscles, but you can't tell a four-month-old infant to exercise. He decided he would have to stimulate the child's interest with some movable device.

In his basement he found a three-foot length of lightweight steel chain which he slipped through some rubber tubing. He strung some colored rings and bells on it. He hung this across the tot's crib, fastening one end with a spring he had filched from an old bird cage, and watched with baited breath.

Right away the child was intrigued—she began yanking at the colored rings, watching them bounce, listening to the tinkle. She moved her eyes to see what was going on. Soon, she moved her head and within six weeks her muscular trouble had vanished.

A lot of Eisel's troubles vanished, too, because he marketed his idea with Childhood Interests as the Cradle Gym and since then more than 3,000,000 have been sold. Eisel has been collecting better than $10,000 annually in royalties with no recession in sight.

If it's games you have a bent for, there are numerous companies who will be glad to appraise your ideas, among them Parker Brothers, Milton Bradley and Selchow & Righter. Some of them have gone so far as to advertise for game ideas.

Here, too, the watchword is originality and if you try to pass off some variation of Monopoly or Parcheesi you'll get nowhere. John Scarne, who is probably the world's greatest authority on card games, is just about to launch a new game called Scarne's Challenge which he says has taken him 11 years to develop. Watch for it and see if it hits the million-dollar jackpot.

In general, games for children are better than those for adults, grown-ups being more

prone to fall for fads and then cool off quickly. If you can interest all ages with the same game, as with Monopoly, then you've got something.

The makers of electric trains are a good potential market for the more mechanical gadgeteer. The gentlemen who control this business would give their eyeteeth for nifty new wrinkles. "We're always receptive to outside ideas," says J. Lionel Cowan, chairman of the board of the Lionel Corporation. "But they must be patentable." He explained that since Lionel once spent $34,000 to win a $20,000 judgment in a patent litigation, he has soured on cloudy ideas and wants to own his gadgets free, clear and unquestioned.

Lionel's smash hit of 1948-49, and still booming, was the little gateman who runs out with a lighted lantern when the train zooms by. This idea was submitted by an outsider who did very well with it—more than a half million have been sold. The latest Lionel innovation is a flock of tiny cows that move automatically from a loading platform into a cattle car and move out again the next time around. If you can add a moo to those cows, you're in!

With 43,000,000 customers yammering for a new toy, the market for ideas is unlimited and the payoff excellent if you can fill the specifications. But, just what steps can you take if you have an idea you believe has merit? Here's what the experts say:

Before getting excited, find out how much it'll cost to mass produce your toy. If it will make a dollar item—fine. Two dollars is still good, but three is nearing the point where buyers think twice.

Next, have an attorney make a patent search, which costs only a small fee. If the search shows that someone else has already patented the same idea or one too close for comfort, you may as well start all over again.

But if the idea's virgin, then you should make a model as workable and as attractive as possible. But, mind you, be a little bashful about displaying it. There are wolves in the toy business as in any other and lambs have been known to be bitten.

There's an oft-told tale of a trustful inventor who showed his unpatented idea to an unscrupulous tycoon who said he was sorry but he didn't like it. As soon as the inventor left, the man had the idea made into a model, got it patented and made a potful of money on it.

You can avoid the possibility of a disaster like this by shelling out two or three hundred dollars for a patent that'll protect you for 17 years. Or, you can register the idea with a patent lawyer, which may cost from

[*Continued on page* 155]

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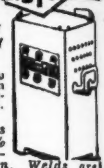

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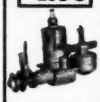

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Million-Dollar Toy

[*Continued from page* 153]

$50 to $75 and will protect you for several months while it's being marketed. Or, you can just take your chances and show your ideas to manufacturers known to be honest and reputable.

In this, your best bet would be to get hold of the toy trade-journal directories and contact manufacturers making similar toys. There's Playthings Directory published by McCready Publishing Co., 71 West 23 Street, New York City, and the Toys and Novelties Directory, Chicago 1, Ill. And if you're really unable to find help in these, you may be given a helpful steer by the toy makers' trade organization, Toy Manufacturers of the U.S., Inc., located in the 200 Fifth Avenue Building, New York City.

Mark that address well—200 Fifth Avenue—because it's the toy center of the world. Hundreds of big toy makers have wholesale offices there and others such as Gilbert and Lionel are only a furlong away.

If you're lucky enough to find a buyer for your idea, you may get a small clincher payment, but the real payoff is by royalty on the number sold. Be sure that the royalty is clearly mentioned in the contract and that the company agrees to start production within a reasonable time. Otherwise they may keep it on ice for years while you just whistle and fidget.

If the toy makers say your idea smells, better take their word for it—they're pros in the game. The thing to do in that case is follow the example of Vernon Eisel, the Cradle Gym inventor. Grab an old chain, a battered bird cage, maybe some tinkling bells and go to work on something else. Put them all together and, who knows, they may add up to a million dollars! •

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1/4" POWERHOUSE ALL - PURPOSE ELECTRIC TOOL KIT

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POWERHOUSE outperforms most drills selling for $20.00 and more! 17 to 1 steel gear ratio maintains power without danger of overloading. Contains EVERYTHING for home or workshop . . 5" lamb's wool polishing bonnet; rubber back-up disc; 4 sheets sand paper; paint mixer; 3 HIGH SPEED twist drills, 1/8", 3/16", 1/4"; mandrel assembly; Powerhouse Drill. Packed in natural-grain wooden box. Perfect for mixing paint, for sanding, waxing, polishing furniture, woodwork and cars. Drills holes up to 1/4" in steel . . 1/2" in wood.

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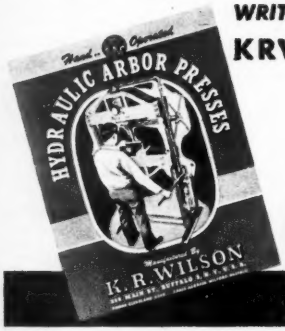

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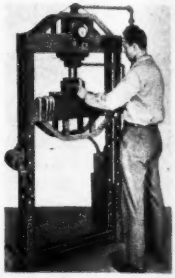


K. R. WILSON, DEPT. 53, 215 MAIN ST., BUFFALO 3, N. Y.

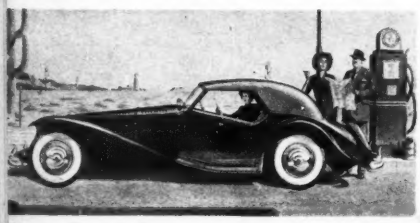
McCahill's Dream Car?

IN the January 1949 issue of MI we printed an article about Tom McCahill's Dream Car. It looked something like a Maseratti from the front and a Lincoln Continental from the back—with a lot of everything else in between.

It stirred up quite a commotion and many readers wrote to us about it. One reader, Jimmy Chai of Joliet, Ill., did more. He went out and built it! But let Jimmy tell you:

"I'm an American Chinese born in Honolulu and the only Chinese in this auto building and race car racket. Counting the time I spent on parts last year, it took me 11 months to build at a cost of $3800. Vital statistics: chassis, 1941 Mercury; front fenders, 1930 Chevrolet; rear fenders, 1930 Ford; grille, 1947 Buick; body cowl, 1937 Ford; rear trunk, 1936 Ford; engine, Mercury. With aloha nui loa,

Jimmy Chai"



When Tom McCahill put his dream car, above, down on paper, he didn't think it'd become a reality so soon. But mechanic Jimmy Chai went to work and came up with practically a carbon copy, right.

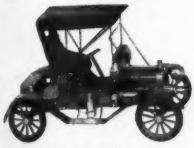
The Ideal Gift for the Hobbyist and Collector!

1903 Rambler
6½" long. $2.50

1904 Oldsmobile
6" long. $1.95

Hudson Miniatures' "OLD TIMER" Auto Kits

Featuring the latest addition to our line —the 1903 RAMBLER, forerunner of the Nash



1911 Maxwell
7½" long. $2.50

The authentic detail and colorful appearance of Hudson Miniatures' "Old Timer" autos enhance dens, offices, club and game rooms. These ¾" scale models make up one of the finest selections ever offered to collectors, hobbyists, museums, schools and decorators. Kits come with full instructions and plan. Easy to assemble . . . no carving or tedious fitting of small parts. Prefabricated kits contain cast plastic wheels, cast headlamps, cowl lamps, radiators, horns, bulbs, steering wheels and radiator caps. Other parts are die-cut or cut to length. Sorry, no C.O.D's. Add 25c for postage and handling.

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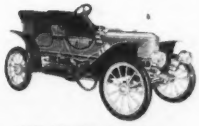

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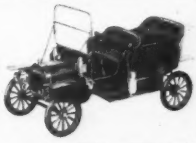
1910 Model "T" Ford
8" long. $2.50



1909 Model "T" Ford
8" long. $2.95

SCRANTON HOBBY CENTER, Dept. 2, 315 Adams Ave., Scranton 10, Pa.

BOYS! This coupon may send you to college!

It gets you started on a model car that can win a $4,000 University Scholarship—a cash award—a tool chest —or all-expense convention trip! It's your first step in the 1950 Fisher Body Craftsman's Guild Competition — 734 awards — $65,000!

SEND COUPON NOW FOR ★ **FREE** Guild membership! Craftsman's button and card! Plans on building model!

If you were between 12 and 20 years of age on Sept. 1, 1949, this may be the biggest thing in your life.

For in the 1950 Fisher Body Craftsman's Guild Competition, you've a chance to win one of 8 University Scholarships, worth up to $4,000. Also—expense-paid trips, generous cash awards, tool chests—altogether 734 awards worth $65,000.

No Entry Fees! No Special Tools! Send in the coupon for your FREE membership in the Guild, FREE Craftsman's button, FREE instructions. Then, using balsa or any suitable material and the simplest tools, you simply make a solid scale model of your idea of a modern car.

So Get Started Now! It's not work—it's fun! Fill in and mail that coupon. It may make a college man of you!

LOOK AT THESE AWARDS

8 University Scholarships—worth from $1,000 to $4,000 each. All-expense trips to the Guild Convention. Cash awards—up to $150 each. Model Builders' Tool Chests.

A Grand Total of 734, Worth $65,000

Identical awards for Juniors and Seniors

(If the son of a General Motors employe wins, a duplicate award is given.)

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You're eligible if you were at least 12 but not yet 20 years old on Sept. 1, 1949. You compete against boys in your own age group—there is a Junior Division (12 to 15 years inclusive) and a Senior Division (16 to 19 years inclusive). You build a solid model of a car. No special tools needed.

FISHER BODY CRAFTSMAN'S GUILD, Dept. L
General Motors Building, Detroit 2, Michigan

Please enroll me in the Fisher Body Craftsman's Guild Competition for 1950. Also — send the Craftsman's button and membership card plus complete instructions for building a model. All this will be sent FREE and without obligation to me.

Name_____

Address_____

City and Zone_____ State_____

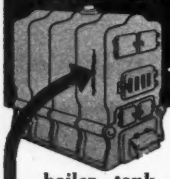
I was born on the_____ day of_____, 19___

Parent or guardian_____

Name of my school_____

Town_____ State_____

STOP FURNACE LEAKS
Save Fuel Costs



Seal up every heat-wasting crack, opened seam and other leak in your furnace, boiler, tank, radiators and piping *tight*—as professional repair men do—with Smooth-On No. 1 Iron Cement. Do it yourself—now—and cut this winter's fuel bills. You apply Smooth-On like putty, it hardens like metal, and *stays* tight, because it expands slightly as it sets. Buy Smooth-On No. 1 in 1¾-oz., 7-oz. or 1-lb. size at your hardware store. If they haven't it, write us.

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THE IRON CEMENT OF 1000 USES

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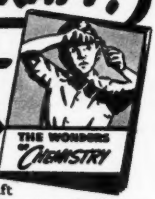

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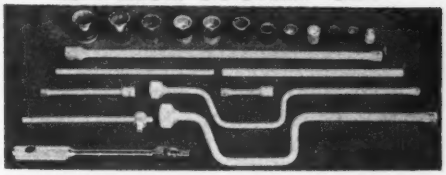

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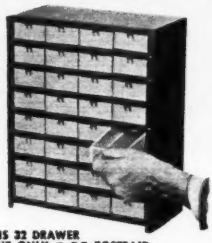

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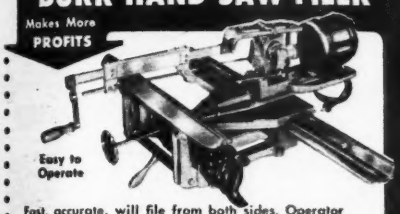

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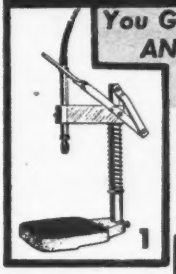
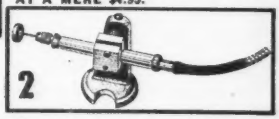


1

DRILL PRESS ATTACHMENT

1. New Foredom offers you a DRILL PRESS ATTACHMENT for use with Model 100 (see below) and for the many thousands of Foredoms already in use. Handpiece quickly clamps in place and drill press is ready for use, ready to pay for itself ever and over again! PRICED AT A MERE $4.95.



2

B-R-S ATTACHMENT

2. The new Foredom B-R-S ATTACHMENT (Bench Stand, Router, Shaper). Speedily clamp handpiece in place and magically you have one unit which serves as a bench grinder with angular adjustment, a router (complete with detachable guide for routing borders) and shaper. Can be used with Model 100 and thousands of Foredoms now in use, providing endless hours of fun and profit. TRIPLE UTILITY FOR ONLY $3.50.

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Model 100 Flexible Shaft Machine with all-metal PENCIL SIZE HANDPIECE equipped with CHUCK GUARD to PROTECT YOUR FINGERS and provide SENSITIVE POSITIVE, FINGER-TIP CONTROL for the most delicate tasks. Husky little high-speed universal motor. Foredom's quarter-century reputation for precision workmanship goes with each machine. Other heavier duty models at proportionately reasonable prices. No. 25 Accessory Set (a truly versatile assortment) $5.50 extra. Also No. 1000 Kit, comprises No. 100 Machine illustrated and set of 12 accessories, all in wooden case for only $21.50. 6-step Foot Rheostat $4.85. USE IT to GRIND, POLISH, DRILL, SAW, SAND, CARVE, MILL, CLEAN, ETCH, ENGRAVE, ETC. on all metals, wood, plastics, glass, leather, linoleum, etc.

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COMPLETE WITH MOTOR

3.

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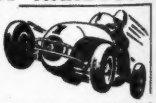

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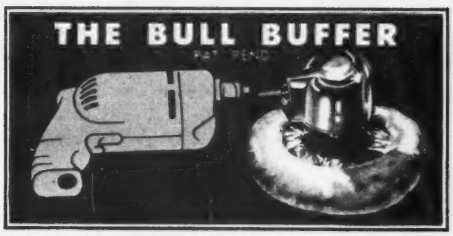

$9.95 Famous angle-head polisher-sander complete with sheepskin bonnet and 2 sanding discs. Fits the chuck of any ¼ inch electric drill. A heavy-duty, rugged tool you'll use to make your car, floors, woodwork, furniture gleam like new! It's America's First Choice—more than 100,000 in daily use. Order today!

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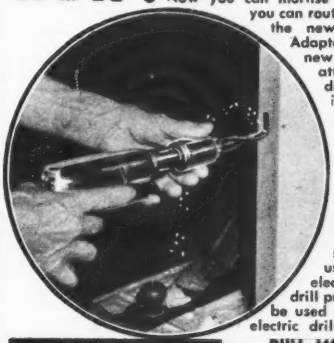
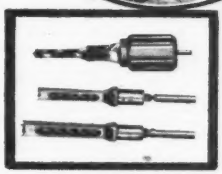
Now you can mortise *on-the-job*, now you can rout *on-the-spot* with the new Bull Mortising Adapter! This amazing new adapter can be attached in either drill or drill press in a matter of seconds, and it gives you a powerful, *portable* tool that really makes the chips fly!



NOTE: Bull Mortising Adapter is designed specifically for use in any ¼" electric drill or any drill press; it should *not* be used with ⅜" or ½" electric drills.



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Includes Bull Mortising Adapter and ¼", ⅜", and ½" chisels with corresponding bits. Complete, guaranteed, only..... **$23.90**

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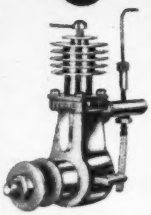

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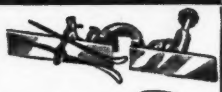

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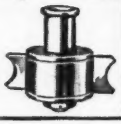

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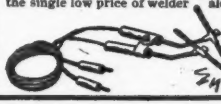

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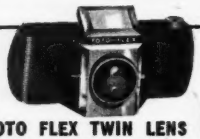

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Telescope Maker's Page

[*Continued from page* 131]

informs us that it took him about 2½ hours to do the excavating on a 5-in. f-8 mirror. The motor drives a 30 to 1 right-angle reduction gear. Pulleys of different sizes govern the speed. •

Complete plans are now available for building the "Quarter-Ton" Telescope Tripod described in the September 1949 issue of MI. Send 75c and your request to the MI Reader Plan Service, Greenwich, Conn. Please ask for Plan No. P-7.

I Turn Leaves To Silver

[*Continued from page* 73]

Then we were ready for business.

We selected the leaves of flowers we wished to reproduce in metal. Then we put a leaf into a mold and made a cast, much as we had done in my original experiments. We injected wax into the mold so that the form of the leaf was delicately reproduced in a wax pattern. Next, we mounted this pattern on a base, put a cylinder around it and poured plaster of paris over the wax duplicate. When we heated the cylinder the wax melted away and got "lost."

Into the plaster of paris molds, on which the wax patterns had left their impression, we carefully injected liquid metal. For injection, we used a special machine that applied centrifugal force to squeeze the molten metal into every crevice of the mold. The cast metal then hardened into delicately patterned leaf jewelry.

We found that some flowers and leaves lent themselves to reproduction more readily than others. These included the leaves of the hollyhock, the geranium, the elm tree and the chrysanthemum.

One of our best selling patterns, and a blossom that can be strikingly reproduced, is the flower of the dogwood. According to legend, the cross on which Jesus Christ was crucified was made from dogwood. On the end of each petal of the dogwood flower is a tiny red spot, like a drop of blood. In the center of the blossom is a small crown, representing the "Crown of Thorns."

After the crucifixion, the legend says, the dogwood trees went to Jehovah and pleaded that the dogwood tree never again be allowed to grow big enough to furnish timber for a cross. Hence, the smaller size of the dogwood tree today.

In our silver dogwood-blossom pins the two vertical petals are long and narrow, the upright section of the cross. The shorter, horizontal petals represent the bar and complete the cross.

Top price for our silver leaf pins ranges from $10 to $12. For gold leaves the price is $30 to $100.

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I keep remembering that lucky day when I accidentally dropped a bit of dental investment on a zinnia—and discovered how to turn leaves into silver. •

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Fifty or 60 million years ago, in the time the geologists call Early Tertiary, the climate of the whole earth was warmer than it is now, Professor Chaney said. But there was a marked zonation just the same. Plant fossils collected in the Far North show that it had a temperate climate like that of the central and northern United States. In what is now the Pacific Northwest, conditions were subtropical.

In between these two great vegetational regions, there was an intermediate zone. In this, there were trees and shrubs representative of the regions on either side, but the dominant tree was the "dawn redwood" or Metasequoia, living representatives of which have recently been found surviving in China. Interestingly enough, the present Chinese Metasequoias also occupy an intermediate position, with cool-temperate trees to the north and warm-climate forests to the south.

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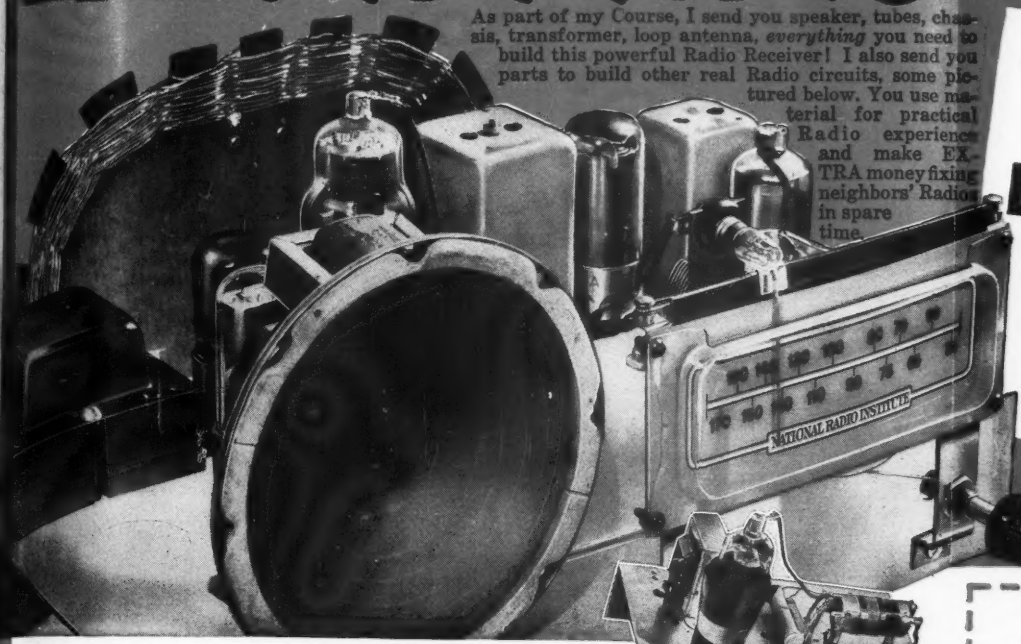

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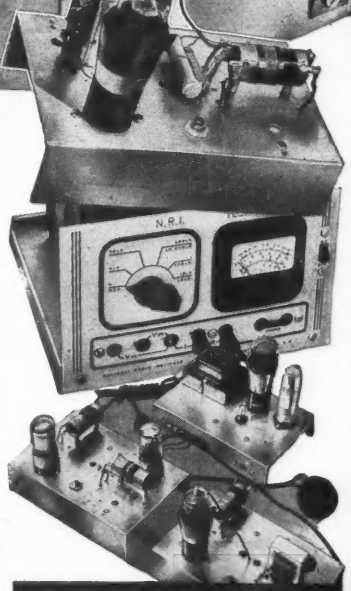

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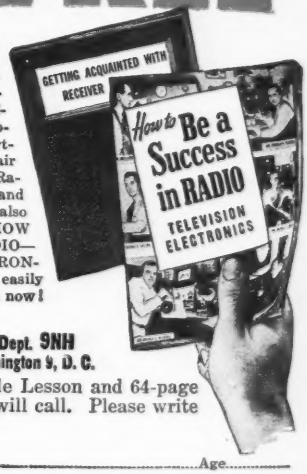

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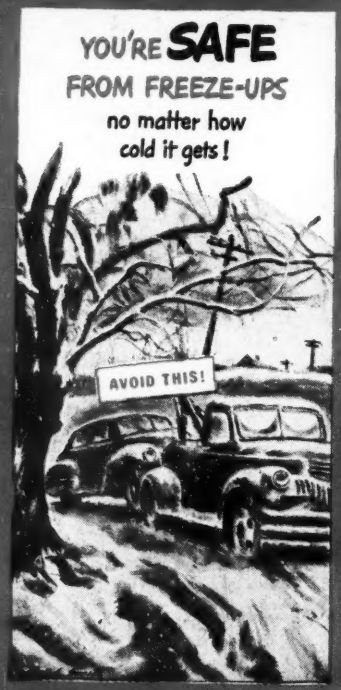

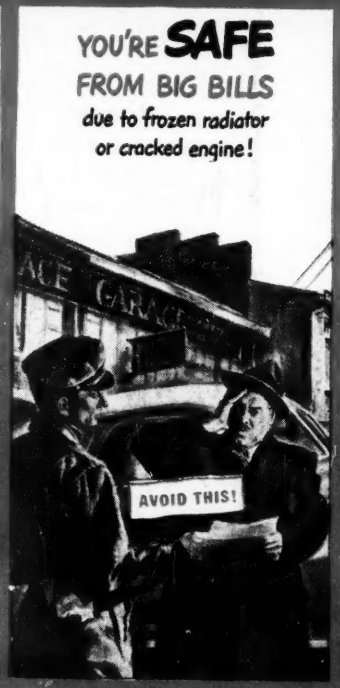

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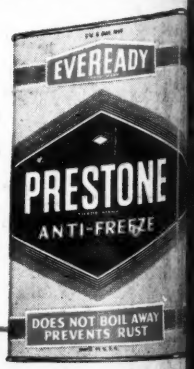
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